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USSR Report

ENERGY

No. 99

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ELECTRIC POWER

INTERVIEW WITH USSR FIRST DEPUTY MINISTER OF POWER AND ELECTRIFICATION

Kiev RABOCHAYA GAZETA in Russian 22 Dec 81 p 1

[Interview with First Deputy Minister of the USSR Ministry of Power and Electrification, Sklyarov: "Today is Power Industry Workers' Day: In the Mainstream of Technical Progress"]

[Text] The role of the power industry in the development of the national economy cannot be overestimated. Increasing the amount of electric power available for consumption is, in the final analysis, an increase in labor productivity, the growth in the amounts of production and product quality, and the reduction in the expenditures of raw materials in many production processes, and the improvement in labor conditions and way of life.

The 26th Party Congress outlined new frontiers for the development of the Soviet Union's fuel and power complex. In 1985 the output of electric power will be 1,550 to 1,600 billion kilowatt-hours. The Ukrainian power industry faces many serious problems. The Ukraine is a component of the national unified power system. V.F. Sklyarov, the first deputy minister of the UkSSR Ministry of Power and Electrification, discusses these matters with our correspondent.

[Question] Vitaliy Fedorovich, please tell us a bit about how the republic's power industry has grown in recent years.

[Answer] During the past ten years nearly 19 million kilowatts of capacity have been put into operation in the Ukraine. Each year they generate more than 100 billion kilowatt-hours of electricity. Included in these power stations are the Zaporozhskaya and Uglegorskaya GRES's, with a rated capacity of 3.6 million kilowatts each. Just these two power stations alone produce each year as much as all power stations in the Ukraine in the year 1960.

Last year the third power unit, a "millionik", of the Chernobyl'skaya AES was put into operation. Since it began operating, this power station has generated more than 45 billion kilowatt-hours of electricity. More than 22 million tons of coal would be required to produce this much power at thermal electric power stations.

/Question/ At the 26th Party Congress Leonid Il'ich Brezhnev emphasized: "Today, looking forward five or ten years, we must not forget that it is during this time period that the national economic structure, with which we will enter the 21st century, will be forged and created." The power industry of the future is what we are calling the atomic power industry. How will the Ukraine's power industry change in this plan?

/Answer/ Now our republic is an enornous new construction undertaking in the atomic power industry. The Yuzhno-Ukrainskaya, Zaporozhskaya, Khmel'nitskaya, and Krymskaya AES's are now under construction, while work on the Chernobyl'skaya and Rovenskaya AES's is continuing. In addition, the Odesskaya ATETs , the USSR's first large atomic heat and electric power station, is now being built.

By the end of the 11th Five-Year Plan the total installed capacity of atomic power stations in the Ukraine will be increased significantly.

Atomic electric power stations are being improved. The creation of a standard AES design with power units rated at one million kilowatts each has been an important achievement; the standard design makes it possible to manufacture construction structures in plant conditions, while extensively using prefabrication in installation. Now the standard design is being used to rapidly construct the Zaporozhskaya AES with a rated capacity of four million kilowatts. The power station's first power unit will be on line by 1983, and additional "millioniks" will be put into operation in each of the following years.

A new stage in the development of the atomic power industry is the use of nuclear reactors for the centralized heating of large cities. The completion of an ATETs in Odessa, for example, will make it possible to reduce the annual expenditure of fuel by two million tons, will eliminate more than 500 small boilers, and significantly reduce the pollution of the atmosphere.

/Question/ Power consumption over a 24-hour period is distributed very unevenly: the morning and evening "peak" hours are followed by night-time unloadings, when some of the equipment has to be shut down. But the best operating indicators of a TES and AES are attained in the base mode. What are you doing to deal with this "arrhythmia"?

/Answer/ It is true that a significant portion of the capacities are shut down during the night. This takes its toll on the equipment and results in a significant overexpenditure of fuel.

To stabilize power consumption we propose making use of stored water power stations. They will consume the power generated at an AES and TES during the "downfalls" and then during the "peak hours" they will release it to make up the shortfall. The Kievskaya GAES was the first such power station in the USSR. Work modes, equipment and design solutions have been tested here.

In the current five-year plan in the republic it is planned to build three more GAESs: the Kanevskaya, the Dnestrovskaya, and the Konstantinovskaya. Their creation will make it possible to significantly improve the technical and economic indicators of work of the base electric power stations and to do away with the need to shut them down during the night.

/Question/ Of particular importance for the future of the electric power industry are the non-traditional sources of electric power - the use of solar energy, geothermal, and the wind. Tell us about some of the work in progress in our republic in this direction.

/Answer/ Serious attention is being given to non-traditional sources for the production of power in this sector of the economy. For example, in the Crimea, in the village of Lenino, work has gotten underway to construct an experimental-industrial solar electric power station with a rated capacity of 5,000 KW. Using this as a starting point, in the future a large helioelectric power station capable of producing 300,000 KW will be created. Work is now in progress to design a geothermal electric power station with a rated capacity of one million KW in the Zakarpatskaya Oblast. Wind-powered electric power stations are also of considerable interest. According to estimates of scientists and specialists, the production of electric power in the republic using the wind can amount to 20 to 30 billion kilowatt-hours per year.

Key questions of the future of the electric power industry are concentrated in the republic target scientific-technical program entitled "Energokompleks". The power industry workers will work with representatives from other ministries and departments and the scientists of the UkSSR Academy of Sciences, the UkSSR Ministry of Higher and Secondary Specialized Education and the branch institutes to solve these problems.

The program embraces such pressing problems as increasing the efficiency of AES operation, improving the electric power network management, modernizing the boilers, turbines, generators, transformers and other equipment at the existing electric power stations and networks, improving the technology for the combustion of low-grade solid fuel and others.

The realization of this program will significantly improve the quantitative and qualitative work indicators of our ministry, and will ensure a reliable supply of power for the development of the republic's national economy.

/Question/ In speaking about the problems of the power industry, one must touch upon the ecological problems. The growth in the number of atomic power stations and the location of the ATETs near large cities unavoidably heightens public interest in these questions.

/Answer/ The measures that are outlined in the designs and that are being taken are ensuring that all types of atomic power stations will be safe for both people and the environment. As demonstrated by many years of experience in the USSR and abroad, the amount of radioactive substances, which the AESs release into the environment, is almost inconsequential. They pollute the atmosphere less than do the thermal electric power stations and the boiler-fired centralized heating systems. After all the atomic power stations do not eject smoke and ash and do not use the oxygen of the air for the technological process.

The preservation of the environment is receiving an enormous amount of attention. During the 10th Five-Year Plan more than 80 million rubles were spent for these purposes. Facilities for purifying the waste waters were built at the Darnitskaya, Severodonetskaya, Khersonskaya, Cherkasskaya and other TETs. Also built were systems for a recycled water supply at Ukrainian electric power stations with a total productivity of almost 20 million cubic meters per day.

During the current five-year plan the power industry workers face even more pressing assignments for realizing measures to protect the environment. Waste water purification systems with a total productivity of more than 35,000 cubic meters per day are to be put into operation at several electric power stations. Also planned for completion are installations for the recovery and neutralization of harmful substances from smoke and installations for the removal of dry ash and the utilization of the harmful substances recovered from the waste gases.

In these times the power industry workers of the Ukraine, as the entire Soviet people, in preparing to commemorate the 60th anniversary of the formation of the USSR, are making increased socialist pledges. The primary point in these pledges is to ensure the stable, reliable and qualitative supply of electric power for the ever growing needs of the national economy.

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ELECTRIC POWER

FUTURE OF POWER PRODUCTION EXAMINED

Tallinn SOVETSKAYA ESTONIYA in Russian 22 Dec 81 p 3

/Article by O Nymmenees, chairman of the ERK of the Trade Union of the Workers of the Electric Power Stations and the Electrical Equipment Industry: "Plus Electrification"/

/Excerpts/ Estonia's power industry. During the years of Soviet power such large electric power stations as the Kokhtla-Yarva TETs, the Pribaltiyskaya GRES, and the Estonskaya GRES have been put into operation in the Estonian SSR. Each of these power stations has brought something new in the use of low-calorie and high-ash types of fuel as used in the power industry practice. The construction of high-voltage electric power transmission has also proceeded rapidly. The reliable operation of the power lines is crucial to the uninterrupted supply of power to consumers. It is not just the national economy of the Estonian SSR that benefits from this electric power: nearly half of the electricity that is generated in Estonia is transmitted to Leningrad and Pskov oblasts and the Latvian SSR.

For the 11th Five-Year Plan an extensive program is planned. Thus, at the end of the second quarter of 1982 the second power unit at the "Ira" TETs will be brought on line, which will make it possible to improve the supply of heat to the city of Tallinn. The further development of the capital's heat supply system will make it possible to eliminate several small boiler units, which must have a positive effect upon the city's air basin.

As before primary attention in the current five-year plan will be devoted to the shale power industry. In conditions of the northwest power system of the USSR, a component of which is the Estonian power system, the power consumption regime is unique in its extreme irregularity. The specific nature of the atomic electric power stations, which operate in our region, is such that to "discharge" them, meaning to cut back on the amount of electricity produced, is economically disadvantageous. The shale-oil GRES's will provide the needed flexibility in our region.

Incorporating such colossal amounts of shale (its expenditure reaches 100,000 tons per day) into the USSR's fuel balance has led to several difficulties, with which the USSR's power industry workers have yet to deal. Thus, in solving the problem of slagging of the heating surfaces of the boiler units, our specialists have determined that the shale ash contains a great deal of free lime. Scientists have been asked to look upon the shale ash as a potential fertilizer. It seems that the ash is completely suitable for these purposes. It remains to be decided how to collect and remove the ash. This task fell to our specialists. At present the Pribaltiyskaya and Estonskaya GRES's are shipping up to three million tons of shale ash to agriculture each year. In addition, the wastes of the electric power stations are being used in the construction materials industry for the production of autoclave reinforced concrete articles and as additives to cement.

In the current five-year plan work will be undertaken to comprehensively use shale. In connection with this particularly high hopes are being placed upon the results of the start-up and adjustment work on the power equipment installation for the processing of shale at the Estonskaya GRES; this installation is to extract oil and gas from shale which can then be used as a fuel. If successful, the results of this important and complicated undertaking will be hard to overevaluate.

It must be pointed out that the course toward the comprehensive use of organic fuel (in Estonia - shale) is correct and will subsequently be implemented in practice. At the same time the comprehensive use of organic types of fuel is leading to the exhaustion of their supplies, which are limited and cannot be replaced. For this reason Gosenergonadzor /State Inspectorate for Power Engineering Control/ of the Estonglavenergo /Estonian SSR Power Authority/ is doing a great deal of work to increase the efficiency of power consumption. Over the past eleven months Estonian enterprises have conserved 85.8 million kilowatt-hours of electricity and 327,000 Gcal of thermal energy. At enterprises of Estonglavenergo 16,300 tons of conventional fuel and 9.1 million kilowatt-hours of electricity have been conserved.

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ELECTRIC POWER

PROSPECTS IN DEVELOPMENT OF LITHUANIAN NUCLEAR ENERGY

Vilnius TIESA [TRUTH] in Lithuanian 17 Feb 82 p 2

[Interview with Algirdas Žukauskas, vice president of the Lithuanian SSR Academy of Sciences, by correspondent Teresė Kezienė; date of interview not specified]

> [Text] The presidium of the Atomic Energy Commission at the Lithuanian SSR Academy of Sciences has initiated the publication of monographs and collections of articles from a series on "Thermal Energy and Environment." These publications will examine the influence of thermal and atomic power plants on nature, and the possibilities of utilizing heated water in the economy.
>
> Published by "Mokslas," the first two books are "The Hydrothermic and Hydrochemical Regime of the Lithuanian GRES Water Reservoir and Cooler" and "Effects of the Thermal Regime of the Lithuanian GRES Water Reservoir and Cooler on Aquatic Life."
>
> We have asked the chairman of the editorial board of these publications, vice president of the Lithuanian SSR Academy of Sciences, Academician Algirdas Žukauskas, to comment upon the direction and trends of energy development in the republic, and upon some scientific problems raised in these books.

[Question] Never has the land of the Nemunas River had as much electrical energy as at present. However, even today discussions center on how to conserve and use it more rationally, as there still is a lack of it. How much energy is being produced and how much of it, after all, do we need?

[Answer] I should like to go back a ways in my answer. Indeed, why did energetics find itself at the center of both economic and scientific attention? The general course in this direction, shall we say, was determined by thermophysics and nuclear physics, by electrodynamics and plasma and solid body physics, by quantum radiophysics and other branches of physics. This is not a coincidence. An examination of the needs of our planet's population indicates that from 1970 to the end of this century as much energy will be needed as mankind has consumed in the last twenty centuries. The progress of economics, culture and science itself depends mainly on energy development. This is one aspect of the matter.

As we know, part of the world was shaken by the energy crisis in 1973. People became aware for the first time that the reserves of fossil fuel, especially of liquid fuel, or oil, are not inexhaustible. And though the causes of this energy crisis are more economic and political, the basic reality--that even deep in the earth the existing fuel has its bottom--is nevertheless compelling us to think of new energy sources and to search for them.

These problems are not unfamiliar to our country either, especially to our republic, which has almost no fuel reserves while demand keeps increasing. I should like to make a few comparisons: presently we are producing as much as 120 times more electrical energy than in 1940 before the war. The consumption was then about 30 kilowatt-hours per person, and presently it is 3,500 kilowatt-hours. Another example: working hard every day a worker uses muscular strength equivalent to 200 kilowatt-hours of energy per year. Today, a farm worker has more than 4,000 kwh to assist him, and an industrial worker about 13,000 kwh.

The consumption of electrical energy is especially increasing in everyday life. Every family today has not only a television set, a refrigerator and a washing machine, but a number of other electrical appliances as well, and is acquiring still new ones every day.

It is a very high jump. But, we can ascertain whether we are producing a large or a small amount of electrical energy, only by comparison with other republics. In this respect we are only catching up, since in the Soviet Union there are republics that have overtaken us; so have some foreign countries with a similar economic structure, whose consumption of electrical energy per working person is twice or three times as high. After making some estimates of how much of it will be needed for the next two or three decades, we will find that we must increase the production of electrical energy no less than two or threefold.

[Question] The immediate question is whether the AES under construction will solve this problem?

[Answer] There is no doubt that it will. Just as some time ago great hopes were set on the Kaunas GES and later on the Lithuanian GRES, so now with the same hope we await the flow of energy from the Ignalina AES.

When in 1972 the Lithuanian GRES started operating at full capacity, we knew that electrical energy requirements would be reasonably met until 1980. But, here we are in 1982, and now we have to use the assistance of other republics. We are going to get from them several hundred million kilowatt-hours this year, and the deficit will be even larger next year.

The Ignalina AES operating at full capacity will again supply us with enough electrical energy at least until the end of the century. This way we will partly solve the fuel problem as well. Oil, oil products, gas and coal, instead of being burned in the power plants, could be used to meet industrial and transportation needs.

An AES will use approximately the same amount of fuel in a year as a TETs of the same capacity burns in one hour.

One more very important fact--an AES will operate only at a constant capacity. We therefore will have a large amount of spare energy available at night which we will be able to put to wider uses. Where and how is already under consideration.

[Question] What portion of energy are AES's currently contributing to the total amount of electricity used in our country and in the world?

[Answer] There are many countries were AES's are in operation or under construction. In France, Belgium, Switzerland and Sweden they are producing more than 20% of the total electrical energy. In the Soviet Union--only 5%. At the 25th CPSU Congress it was pointed out that we too need to build more AES's, and the western part of the Soviet Union, which has almost no fuel of its own, should move only in the direction of AES's. This plan is being consistently carried out.

[Question] The designers and builders of the Ignalina AES appreciate the results of research conducted by the scientists of our republic. I have in mind the Institute of Physical and Technical Energy Problems and the contribution of its workers in an effort to improve the AES. What work of interest and significance [illegible] been accomplished here?

[Answer] AES's are rather peculiar architectural monuments and the acme of scientific and technical progress. Many problems have already been solved--the AES's at Kursk, Leningrad and many others are already in operation. However, progress is a dynamic process as we all know. Working hand in hand with other scientific and technical centers of the country we have realized many a new idea and improvement. At the Ignalina AES, let us say, the heat recovered from the reactor will be utilized more efficiently than in Leningrad, and steam separators will operate more effectively. The Institute of Physical and Technical Energy Problems, which is one of the centers researching heat exchange and hydrodynamic problems, is conducting experiments on hydrodynamic vibrations.

Not long ago "The China Syndrome" was shown in movie theaters. Although the situation presented in it is a fiction which does not correspond to a real situation in an AES, many of those who have seen this film can have some idea of the danger caused by vibrations. When you increase the capacity of heat exchangers, the possibility of hydrodynamic vibrations is also increased. This means that there is a need to improve heat exchangers and to design the equipment so as to eliminate hydrodynamic vibrations. Some very interesting work has been done at the institute on this subject.

I also should like to mention the reactor automatic control developed here. It is an improvement compared with other power plants.

[Question] You mentioned the film... Is there a real basis for a similar accident?

[Answer] Practically none. AES's are designed and built in compliance with unusual requirements and standards. All of the most dangerous equipment has double and in some cases even triple safety systems. The reactor itself is designed in such a way that, in principle, an accident cannot happen and a large amount of radioactive material cannot spread into the environment. I am well abreast of worldwide data. Several hundred nuclear energy reactors whose total capacity is about 140 million kilowatts are already in operation around the world. Some of them have been in operation for more than 20 years; however, there has been no accident that would have caused casualties or seriously contaminated the environment. In spite of it, safety requirements are being tightened even more everywhere in design, construction and operation.

Every innovation, every new phenomenon not only arouses curiosity, but also encounters a sluggishness in our thinking. For in 1979, when there was an accident at the AES in Pennsylvania, the news spread all over the world even though there was not a single casualty from that accident. Almost at the same time, a far more serious accident occurred at a U.S. chemical plant in which dozens of people died. Yet hardly anyone paid any attention to it. You see, the chemical industry is a comparatively old industry and accidents are frequent there, so everyone is used to them. However, people's attention to AES's is useful since it makes people even more concerned about their construction.

AES projects in the Soviet Union are inspected by experts with strict and demanding standards. They don't make the slightest concessions. This was also the case with the Ignalina AES project. After expert inspection by specialists, the project was given a thorough evaluation in the republic by experts and scientists from various fields.

[Question] Every power plant of high capacity in one way or another affects the environment. Most likely the Ignalina AES will be no exception. What are the republic's scientists doing to make its effect on nature and the environment as small as possible?

[Answer] You remember the time when the GES's of Birštonas and Jurbarkas were being planned. Those projects were abandoned because large areas of farmland and lush meadows on the Nemunas banks would have been lost.

A growing city, along with its growing industry, also affects the environment and changes the landscape. We are lenient in this and accept it as a necessity. The Ignalina AES is a gigantic structure. If we compare it with the GRES in Elektrénai, we see that the AES, while providing much more energy, would change the environment approximately to the same extent.

Thought was given to the problem of how to protect nature well before starting the construction work at the Drūkšiai lake. It was then that the Atomic Energy Commission was established at the Lithuanian Academy of Sciences, and an extensive research program set up. A large group of scientific institutions took part in this research, the Academy of Sciences Institute of Physical and Technical Energy Problems, the Institutes of Physics, Economics, Chemistry and Chemical Technology, Botany, Zoology and Parasitology; the Department of Geography, and the Scientific Research Institutes of Geology and Agriculture. Elektrénai, with its power plant and heated water reservoirs, became a sort of model doing research on a broad scale and including atmosphere, ground, water, plant and animal life, and landscape.

Another sizeable group of scientists established itself at Druksiai Lake. The research conducted there is even more thorough. With very detailed environmental data it will be possible to react even to the smallest changes, once the power plant starts its operation.

The extent and the intensity of work being done is indicated by the published books from the series "Thermal Energy and Environment," which will be useful to more than only designers of AES's.

[Question] An unusually large amount of data is accumulated in these books about the water reservoir and cooler research at the GRES. Could you summarize it?

[Answer] This is a tremendous task, indeed. Research of this scope and complexity is being conducted for the first time in our country. Perhaps it would not be wrong to point out that it is something new even on a world-wide scale. It is true, there has been a considerable amount of research reported in literature about the effects of power plants on the environment. However, the research is narrow, specific, and just too little when it comes to predicting and making models of the effects of thermal and atomic power plants on nature and establishing an environmental protection system. This is exactly the void out scientists are trying to fill.

Second, a rather important problem which the growth in the capacity and number of thermal and atomic power plants has presented to science is to find the best way to utilize the heated water discharged from these power plants for the benefit of man. One such possibility is the development of the fishing industry. The natural productivity of heated water reservoirs is considerably higher; in reservoirs of this type fish production can be increased tenfold, and by applying industrial methods, even more. Let us not forget the possibilities in the development of greenhouse gardening, the production of microbiological preparations, and others. These are only some of the problems whose solution would be of great advantage to the republic.

And third, there is recreation. In some countries there are recreation and sports centers located near the water reservoirs of AES's. A warm lake where the temperature would reach 26 degrees Centigrade could be a luxury in our relatively harsh climate.

[Question] What problems of importance are arising presently, as the time for the AES to produce power is fast approaching?

[Answer] Builders, designers, scientists and civil engineers are striving to make the Ignalina AES as good and as pleasing to look at as possible. However, how it will perform is no less important, and this depends on the personnel and its training. The Polytechnical Institute imeni Antanas Sniečkus in Kaunas and other higher educational institutions have already started training the power plant personnel. In discussing this question in the Atomic Commission, however, we came to the conclusion that the standards and the pace of training of specialists in the republic are far from being satisfactory. There should be more engineers and technicians in a variety of specialties trained for the power plant, and Vilnius State University should start training physicists and chemists for the plant.

Steam turbines and the economics of electricity production at an AES are essentially not different in any way from those of existing power plants. There are many good specialists in this area in the republic's power plants. Future workers for the AES should be sent for training at AES's already in operation. These are also the problems to which we should now be devoting as much attention as possible.

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ELECTRIC POWER

DEVELOPMENT OF ELECTRIC POWER IN YAKUTIYA

Riga SOVETSKAYA LATVIYA in Russian 11 Nov 81 p 2

/Article by N. Vasenin, chief of the regional power administration, Yakutskenergo: "Yakutiya - the Rapid Development of the Power Industry"/

/Excerpts/ The Yakutskaya ASSR, which occupies one seventh of the territory of the entire Soviet Union, is one of the most difficult regions in severity of climate and difficulty of extracting natural riches. This is the location of the "cold belt" of the northern hemisphere. The territory of the autonomous republic stretches into the zone of the rock formations that have been frozen for many years, the depth of which extend to 600 - 800 meters and more.

Within the bowels of Yakutiya there are many riches - gold, diamonds, tin, mica, natural gas, coal, oil, iron and many other minerals. Their extraction is only now getting underway - the settlements, mines, factories and roads must be built in places that are totally uninhabited.

The needs for electric power are growing rapidly. There was a time, for example, when the use of the electric power produced by the first unit of the Vilyuyskaya GES, with a rated capacity of 75,000 KW, was a problem. Then, in 1967, work was only just getting underway to mine diamonds in Western Yakutiya. But now even the outputs of eight power units of the two sections of the electric power station are not enough and work has started on the construction of another GES on the Vilyuy River.

A similar situation is now evolving in Southern Yakutiya, where the first territorial-production complex is being formed in the vicinity of the BAM. The consumption of electric power in this region is also increasing at a rapid rate. And there are more and more places like this in the autonomous republic.

For the first time in the conditions of the Far North they have constructed an electric power station that uses gas turbines. Suspended above the permafrost on pilings, this power station has for more than ten years constantly and reliably, in all conditions, provided the capital of the autonomous republic and surrounding areas with electric power and heat. This year for the first time a six-kilometer power bridge has been built across the Lena River: 140-meter supports lift the lines above the river and the largest span is 1,700 meters. Current from Yakutsk is now fed through this unique facility to the rural regions, where they have started to cut back on the use of the diesel electric power stations, the use of which will gradually be phased out. In the settlement of Cherskoye, which is located next to the Northern Arctic Ocean, the Soviet Union's first floating electric power station, the "Northern Lights-01" has been operating successfully for more than ten years. Another floating power station can be found on the Aldan River at a place that is hard to reach. In the north of neighboring Magadan Oblast the Bilibinskaya atomic electric power station was put into operation several years ago. This was the first AES to be built on permafrost and it now supplies electric power to several regions of Yakutiya.

Thus, Yakutiya is now using electric power that has been produced by nearly all kinds of power stations. Of course, it costs quite a bit more to build these power stations in the north than it does in the European portion of the USSR. For example, the cost of a single installed kilowatt of power in Kostroma is 120 rubles, while in Yakutiya the cost is 1,000 rubles. More money is allocated to protect the very fragile northern environment. For this reason the correct selection of the most efficient types of power stations is of great importance.

Practical experience demonstrates that the most promising types of power stations in the north are the hydroelectric power stations, which with the help of electric power transmission networks can provide relatively inexpensive power to extensive areas. The heat and power plants must be created only with the condition of their great rated capacity and the possibility of making rational use of coal and natural gas, supplies of which are abundant in Yakutiya. In the far-flung, hard-to-reach areas it is wiser to build small atomic electric power stations.

The 1980's will be a period for even more intensive development of the electric power industry in Yakutiya. A new GES will be built on the Vilyuy River; and two large power stations will be built in Central Yakutiya which will use natural gas. The Yakutskaya GRES will be nearly doubled in size; and the Neryungrinskaya GRES, the largest in the Far East, will be built, marking the beginning of the extensive use of the enormous Southern Yakutsk coal basin. In the north of the Yakutsk ASSR work will get underway on the construction of the Adychanskaya GES. And there are several other interesting plans for the development of small-scale atomic electric power stations.

While building all of these power stations and the connections for the high-voltage power transmission lines a unified power system will be created, which later will find its way into the power systems of the Far East and Siberia, which have already been incorporated into the Unified Power System of the USSR.

8927
CSO: 1822/73

ELECTRIC POWER

SHUL'BA ELECTRICAL STATION RISING ON BANKS OF ERTIS

[Editorial Report] Alma-Ata BILIM ZHANE ENGBEK in Kazakh No 1, January 1982 carries on page 1 a 600-word article by M. Tokeshev, Zh. Atantaev and E. Sydyqov on construction of the 1.35 million kilowatt capacity Shul'ba State Electrical Station, one of the major projects of the current five-year plan in Kazakhstan. Five years ago the Shul'ba was empty, featureless steppe but its condition has changed radically since 4 June 1976 and the beginning of construction on what will be the Shul'ba State Electrical Station.

First priority was assigned to housing and other facilities for station workers, and a new city is rising in the area. Its population is expected to reach 25,000. This, however, is only the beginning since 230 million rubles have been allotted for Shul'ba construction and only 35 million have been expended thus far.

Among Shul'ba projects currently being undertaken is a 254.8 cubic kilometer capacity reservoir, 70 kilometers by 15 kilometers in size. Problems associated with Shul'ba construction include lack of stable cadres and difficulties with technical equipment. Some 28 million rubles of work is to be completed during the second year of the current five-year plan.

9857
CSO: 1832/105

ELECTRIC POWER

KAZAKH THERMAL ELECTRIC STATIONS NOT OPERATING TO CAPACITY

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 3 Feb 82 p 1

[Article: "Reserves for the Power Industry"]

[Text] The 26th Party Congress has planned an extensive program of social-economic changes for the 11th Five-Year Plan. A more detailed outline of the basic directions for fulfilling this program was developed at the November (1981) Party Plenum. In the Plenum decree and in the clear speech of CC CPSU General Secretary L. I. Brezhnev it was noted that the course now being followed for the rapid development of key sectors of the national economy must be primarily based upon the rapid growth in the production of electricity.

The efforts of the Kazakh SSR party and people have led to the creation of a large power potential of a total rated capacity in excess of 30 million kilowatts. There has been a sharp qualitative shift in the very production of electricity. The power industry has been reequipped and is continuing to be reoutfitted with the very latest equipment. All of this is making it possible to fully meet the needs for electric power in all spheres of a steadily growing national economy and on a day to day basis to improve the living conditions of the people. In the Kazakh SSR a considerable amount of experience has been accumulated in the highly efficient operation of the leading enterprises of the power industry.

In the meantime the achievements cannot hide the shortcomings that still exist in the development of the overall power complex or the enormous unused reserves which, unfortunately, still are untapped. The level to which the national economy is provided with electricity continues to lag behind the rapidly growing requirements of the Kazakh SSR's economy.

Last year the power workers did not meet their most important indicators; most importantly, they did not fulfill their assignment for the production of electric power. The utilization coefficient of capacities at the thermal electric power stations, especially at the Ekibastuzskaya GRES-1 and nearly all power stations in Northern Kazakhstan, was low. All of this has meant that in November and December of last year and the first two months of this year during the morning and evening load maximums the consumers have been subjected to significant power cutbacks. Due to these cutbacks enterprises of the ferrous and nonferrous metallurgy industries, the machinebuilding industry and other sectors, sovkhozes and kolkhozes have been experiencing irreplaceable losses. The technology and pace of production are being disrupted and essential kinds of product are being significantly underproduced. For example, several nonferrous metallurgical enterprises have been unable to manufacture millions of rubles worth of product in January of this year for this reason.

There are quite a few reasons for the worsening of the operation of thermal electric power stations. However, the primary reason is the lack of organization and control on the part of management and the appropriate services of the enterprises, power systems, and a weakening in the operational work of the Kazakh SSR Ministry of Power and Electrification's central office. In addition last year's maintenance work was very poory prepared and executed. Things have gotten so bad that eleven power stations, including the Ekibastuzskaya and Yermanovskaya GRES's and the Pavlodarskaya TETs-1 and TETs-3, KarGRES-1, Petropavlovskaya TETs-2, representing more than half of the republic's total power capacities, did not receive their readiness documents for taking on the power loads. And so it comes as no surprise that they are not working to their capacity.

Further successes in raising the economy depend largely upon how efficiently power capacities are used. In connection with this the Party and council organs must deal strictly with the operation of each power station and heating plant and must expect more of the managers of these facilities, who have permitted disruptions in supplying power to consumers, and direct the collectives at making maximum use of inter production reserves. It is necessary to radically change the style of work and the methods of management of the Kazakh SSR Ministry of Power and Electrification. It must become a true headquarters of the sector and accomplish constant control and render assistance on a timely basis, foresee difficulties and skillfully make use of resources.

A primary way to further strengthen the power potential of the Kazakh SSR is to speed up the introduction and assimilation of the capacities of the Ekibastuz complex. The attention of the party and economic organs must be focused on this most important sector of work. Within the shortest periods of time possible it is necessary to stabilize the operation of the 500,000 power units, to pick up the pace of construction and installation of the GRES-1 power units, and to strictly adhere to the schedules for the construction of the GRES-2.

The reliability of the operation of the power stations is determined by the high quality of the organization of production, timely preventive maintenance and care of equipment in working condition. Of significant importance is that the power stations receive everything that they need on a timely basis. Meanwhile, the supplies of liquid and solid fuels were below the norm at the start of the current year. There was a shortage of spare parts for the primary and auxiliary equipment. The Kazakh SSR Ministry of Power and Electrification, the

/Kazakh SSR/ State Committee for Material-Technical Supply, and the railroad administrations had to take decisive measures to eliminate these shortcomings. At the same time it is necessary to increase the role and responsibility of the technological services of the power enterprises, to improve the control of production, to achieve a clear and safe operation, and to steadfastly fulfill the established modes and schedules for releasing electricity to consumers.

In practice it is people who execute any plan. Only well-organized labor at each work space, strong discipline, and a high sense of responsibility of those responsible for a given task will produced the desired success. Based upon this, the party, trade union and Komsomol organizations of the collectives of the power enterprises are obliged to activate mass-political and educational work among the workers, to come up with a public and effective socialist competition, to explain to each worker the goals and tasks facing the brigade, shift and enterprise on the whole, to more actively introduce the individual and collective experience of organizing the struggle to raise the efficiency of production, and to achieve a situation whereby the work will proceed well without lagging behind. A new system of material incentives has just been introduced for the output of electricity. The party organizations and economic managers of the power enterprises must more fully use the available opportunities for the development of the labor activity of the collectives.

Practical experience shows that true success comes when people take a hard look at the results of their work and know how to look into the future and to live not just for today but for tomorrow. For this reason even today at each enterprise of the sector and in the Kazakh SSR Ministry of Power and Electrification in addition to doing everything possible to stabilize the supply of electricity for the national economy, they must as soon as possible undertake a serious effort to prepare for a new maintenance campaign, which is already not so far away. It is necessary to have a specific plan for conducting maintenance at each enterprise. It is necessary to make provision for all resources well in advance and to ensure the carrying out of planned measures within established time periods and with a high quality.

It is a matter of honor for the power workers of the Kazakh SSR to fulfill the pledges that they have made for the second year of the 11th Five-Year Plan and to provide a reliable and uninterrupted operation of all sectors of the national economy of the Kazakh SSR.

8927
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ELECTRIC POWER

PROBLEMS WITH 'NORTHERN LIGHTS' FLOATING POWER STATIONS

Moscow LITERATURNAYA GAZETA in Russian 11 Nov 81 p 10

[Article by V. Ervays, member of the USSR Union of Cinema Workers: "Turn on the 'Northern Lights'"]

[Text] A heavy drifting of snow converted the tundra into a foggy sea prior to the freeze-up: the powerful "Uralets" trucks in our column somehow navigated over the moving cover. The drivers protruded from their cabins into the stinging blizzard, their faces covered with snow. Having turned on their headlights, the drivers tried to keep on the crest of the winter road. There was no talk about speed; the decimeters of the road proceeded unevenly. The trucks were kept in first gear and frequently collided with each other.

Just as we reached the Chernaya River, about 25 kilometers from Mys Shmidt, the blizzard stopped abrubtly, as if it had been turned off. We reached the settlement of Ryrkaypiy in bright sunlight, wearing our sunglasses. It had taken us three full days to cover the 150 kilometers from the settlement of Iul'tin to Mys Shmidt.

Following these days on the road I came to the ward room of the floating gas turbine electric power station the "Northern Lights-4" with its ship's cleanliness and comfort, the gleam of enamel and plastic and warmth, the smell of machine oil and something almost like mens' cologne.

I presented myself to Vitaliy Stepanovich Fedortsev, the director of the PIES [floating electric power station]. He is an elegant, self-disciplined and weathered man. I kept wanting to call him captain.

Vitaliy Stepanovich took me on a tour of the ship and its various departments - from ladder to ladder. He led me along the latticed bridges. In the energetic din of the powerful machines, he provided me with precise and substantive explanations intended for the uninitiated.

Vitaliy Stepanovich's office is a standard stateroom with portholes, a white printed plastic and polished wood. The indirect light of the low sun gave the metallic mounts of the photographs of the PIES a golden tint. Everything here breathed of order and well being.

Handing me a large sheaf of papers, Vitaliy Stepanovich said, "this will tell you all you need to know. Page through these papers and if something catches your serious attention, give me a call. We will get together and have a talk. But by then we will almost be on an equal basis: you will know how the collective of the floating power station lives."

The settlement of Ryrkaypiy, near which the PIES stands idle, is located about three or four kilometers from the regional center of Mys Shmidt. It is lost in the snow. Between the houses in a sheltered area, the cruel winds from the ocean do not disturb the snow, which is compacted by the pedestrians and vehicles. New snowfalls add layer after layer of snow. The streets are at the level of the second storey and to reach the doors of the houses one must descend by steps. The streetlights here are just like the ones in the large cities - a dull, lilac-colored light. Their shadows are sooty, and the wind rocks the lights - and the black shadows rock as well.

The snow here is white and the fresh fallen snow turns gray within a day; in the settlement the boiler tenders stoke the sky twenty-four hours a day. The people who installed the smokestacks above the boilers were clever fellows. From sheet iron they cut the figures of witches flying on a mops, which they then attached to the tops of the chimneys. You can imagine - witches on mops and from below the mops swirls the black smoke. Exotica...

In the hotel of the motor base I study the materials in Fedortsev's folder. They include clippings from newspapers.

The newspaper "OGNI ARKTIKI", the organ of the Shmidt Rayon Party Committee and the Rayon Council of Peoples' Deputies (6 July 1978): "Attention: the problems of the power industry. Will the thunder be heard?" and the first phrase:

"It is hard to believe that the time periods for completing the floating power station, the 'Northern Lights", have been delayed for an unspecified period of time. You will recall that as of 22 December of last year the PIES was to have been put into industrial usage. Then the solemn moment was postponed to 1 July of this year. But even this time frame has turned out to be unrealistic"....

MAGADANSKAYA PRAVDA (14 July 1978). The newspaper's correspondent, V. Yevsyukov. "Another Postponement". It is set apart by the type face: "The subsequent time period for starting up the floating power station, the 'Northern Lights', on Mys Shmidt has again been postponed. The managers of the Severovostokzoloto [Northeast Gold Production Corporation] cannot say when the power station will provide power, which is so needed in the gold fields... At the start of July due to the fault of the Polyarninskoye SMU [construction and installation administration] the supports for the high-voltage electric power transmission lines were not installed and the lines were not hung... The Polyarninskoye GOK [mining and enrichment combine] is not prepared to receive the 110 kilovolts (for which a new LEP is to be built)... The transformer organization can only accept 35 kilovolts, which represents enormous losses of power enroute - 20 percent - and up to now they have not laid the LEP-110 KV to the Leningradskiy field"... When will the needed transformer equipment appear at the Polyarninskoye GOK?"

The newspaper OGNI ARKTIKI (6 July 1978): "Yes, the 'Northern Lights' power station has been unlucky from the very beginning. It stood for more than a year in Pevek and was then towed to the shores of Mys Shmidt. But once here the power station "is not shining".

My neighbor in the hotel was Yuriy Zakhvatkin, an electrician from the crew of the "Northern Lights". We introduced ourselves and had a talk.

"Our 'Northern Lights' was built on the pier of the Tyumen' shipbuilding plant, where I worked as a carpenter for the auxiliary service. The 'Northern Lights' was built in one and a half years instead of the two years. We frequently worked around the clock because we knew that the polar region needed electric power badly. We worked conscientiously... I myself am from Kirov Oblast, which is also not the south. I finished my schooling and kicked around the country - workers are needed everywhere. I wanted to measure the earth. I was a boy...

We drink tea as black as tar. Outside of the room are the night and music partly muted. We smoke. Yuriy continues his narration.

"In May 1975 we put the 'Northern Lights' into the water on its way to the ocean. That year the water melted early and the shoals opened on the Tura River. We lightened the 'Northern Lights' and disassembled the superstructure, put it on barges, added pontoons and through the channels along the main stream we led the power station from the Tura River, to the Tobol River and then into the Ob' River, where we again assembled the superstructure...

Yuriy is no story teller, that is plain to see. Following each phrase there is a pause. But he is not choosing words; he is using words to describe facts.

And each fact is a photograph.

"We stood idle for two months in Salekhard: nobody clearly knew what to do with us. And we lived through each day - the Polar region needs current - and we were stuck! ... From May through September we went to Pevek, from whence we rushed jauntily on two tugboats to Mys Shmidt to the site. But it turned out quite the opposite - no provision was made to berth us, no mooring - as if we were not needed here.

Empty handed we returned to Pevek to spend the winter. It is amusing to recall that in Pevek we received electric power for ships' needs from the shore by cable. We got by! ... Of course, the return for the winter bothered the crew a lot: people were hired to work in the Arctic and making a living was not the final factor. And now we were facing the winter... Then Stepanych came to us as the director. He came to the ship, looked around, listened to what we had to say, and then assembled everyone and says, 'I am not leaving here. I am hard to get along with, but you will not have another director. Whoever decides to stay on - get used to the fact that we will work' - and then he signed up everyone who wanted to stay. Three of us, including Stepanych, remained.

During the winter Stepanych did not go ashore - he spent both day and night on the ship. Work proceeded on a ship's schedule - both when there were only the three of us and when the new crew was assembled. Yes, Stepanych was not an easy man. But what am I -honey? My character is sharply defined and I can be bothersome to management, but only when I am right. They remember this and take it into consideration. But we were not lucky, As things began so they continued. We try. The shops on the 'Northern Lights' were in exemplary order and for a long time we had been able to produce our full capacity. But the shore was not ready..."

Newspaper clippings from Fedortsev's folder.

OGNI ARKTIKI (22 July 1978) Ye. Zemlyanikin writes: "The editors are receiving letters from readers who are disturbed by the postponement in the subsequent time period for starting up the 'Northern Lights' power station... Over the past several years we have been waiting for the turbogenerators of the PIES to start producing power. We want to know if there is a limit to the lack of management and responsibility on the part of the managers of the enterprises and other people, who are responsible for starting up this crucial facility. Millions of rubles have been invested in the PIES..."

The reply to the editors by the acting chief of the administration Magadantsvetmetstroy /Magadan trust for the construction of facilities for the non-ferrous metallurgy industry/, V.P. Kompaniyets, was as follows: "Magadantsvetmetstroy, Severovostokzoloto and the Polyarninskoye GOK are taking measures to ensure that the 'Northern Lights' power station is operational in July of this year (1978). This includes the LEP-110 from Mys Shmidt to Polyarnyy."

Newspaper: "However, a week ago at the regular session of the headquarters for completing the construction and for putting the power station into operation, in which V.P. Kompaniyets participated, it was 'suddenly' announced that that power station would not be operating in July. What were we to conclude from this: either the administration of Magadantsvetmetstroy is completely ignorant of the true state of affairs at one of the most important construction projects or it is intentionally misleading the party press organ and its readers."

The chief of the Magadantsvetmetstroy administration, G. A. Bazhanov: "The time frames for the construction were postponed largely due to the non-deliveries of needed equipment and cable."

The newspaper: "...the start-up of the electric power station in view of these shortcomings (bearing in mind several flagrant violations and deviations from points in the plan - author) is counter to the rules of technical operation. It is quite important and mandatory that these shortcomings be eliminated."

"This means that the problem is not just in the non-delivery of the equipment!"

Outside the walls of the hotel the snow storm again rages. The swaying lamps, like soundless bells, scatter the splashes of light and shadow, as if sending into the darkness of the storm intermittent signals of alarm.

Within the circle of light from the table lamp rests the open folder belonging to director Fedortsev. There are 14 clippings from the newspaper "OGNI ARKTIKI". Seven from the newspaper MAGADANSKAYA PRAVDA. The earliest articles are dated 1976, while those that I have cited are from 1978. But outside the the night snow storm began in April 1981. And it is as if these old newspapers are speaking about the present. For even now the customer is receiving only 35 kilovolts from the power station, although it is capable of producing 110!. And now the shore facilities still do not have a completed substation - this means that the "Northern Lights" does not have an emergency line. If the current had to be disconnected, the consumers would be without electric power. In actuality, the PIES as of right now is operating only at one third capacity!

Once again Yuriy and I are brewing some black tea - we drink it one glass after another.

"I gladly joined the army - a new opportunity to see the country. Just one thing confused me - they didn't join me! I happend to serve on the coast. The climate was resort-like and two years flew by like two days. The commander offered me a chance to remain and spelled out the conditions. But I decided to return to the place where I was inducted. It was 1978. I returned to the "Northern Lights" and found that nothing had changed - the "Lights" were not shining. The shore facilities are being finished and the finishing work is getting underway right away. Stepanych gives no quarter! Things are in a bad way, but after the New Year holiday we started up! At one third capacity, without emergency support, and with unfinished work and violations, but we started up. I returned home from the service and found a new wave of people who had been dismissed: no bonuses and they provide no housing. You can understand this yourself: people are working a full shift and we are providing only one third of our capacity. And this continued month after month, year after year. Who could put up with it?"

"You are putting up with it."

"I am a different matter. I have to work until we succeed. I want to see Stepanych happy. Since I came here, I have never seen Stepanych smile. We are only producing one third of the power possible, what does he have to smile about? And one other thing - heat. After all this is the Arctic. Each calorie is worth triple the price! With just our one boiler we could provide the settlement of Ryrkaypiy with 28 tons of boiling water per hour, providing the entire Mys Shmidt with heat and the climate of "Tashkent" in all houses! And we are throwing heat overboard, heating the ocean. It is shameful. You see, I as a man from the "Northern Lights" want to be able to walk the streets with pride knowing that all of the lights that are burning and all of the heat that is produced is the result of my efforts. As things stand I rush home quickly - and I am not to blame, but still I keep my eyes down. And I still have not married. And this is because there are still some loose ends. I am not earning my keep, although I am working, you see? I do not have an apartment, you see? And this is how things are here: a man must take his bride to his home or a room for a beginning. And twice a month he must give her his salary and learn to live within their means without relying on handouts.

At this point I began to imagine a film. The concept became clear. Yuriy Zakhvatkin should be filmed while talking like this, from the soul, and passionately. And to film the chief of the electric power shop, Arkadiy Lazarevich Zats, when he and the workers are digging in the insides of a complicated piece of machinery. He should not be in a white robe, but with the face of a surgeon during a difficult operation. Vitaliy Stepanovich spent an entire year trying to persuade Zats to give up his job and apartment in the Donbass and to fly to the "Northern Lights" because he had accumulated some unique experience in working on a similar PIES, which is now doing an excellent job nearby on the same coast of the Arctic Ocean. And Fedortsev himself should be filmed during one of his five-minute director's meetings, in the shops and in the squabbles with the builders. And in parallel - those responsible for the red tape, who are holding back, not building, who are making purely formal replies, and who are saying nothing. They need to be shown face to face in the film. Fedortsev's strong face and his eyes - suspicious and tense - and sitting at the same table: the chief of the Mys Shmidt Construction and Installation Administration, Ye. V. Shvets; the chief of the Capital Construction Department of the Polyarinskoye GOK /ore enrichment combine7, N. P. Filonenko; the deputy chief power engineer of the Severovostokzoloto Association, N. N. Kalashnikov; the chief of the Magadantsvetmetstroy Administration, G. A. Bazhanov. You feel that this is a lot of people for Fedortsev to handle? I would invite to the same table in support of the PIES director the chief of the USSR Ministry of Power and Electrification's B. A. Sukhanov, who is in charge of the trust of mobile electric power stations. Sukhanov is always helping Fedortsev in his struggle.

Understand me, people, I want very much to define the causes of this "problem" - not only to get at the bottom of the disorders at the "Northern Lights" floating power station but for tomorrow, for after all the Far North will need many more mobile electric power stations.

And suddenly the doubt arises - is this all a game? After all man is showing his contempt and arguing with those in charge as if he were the behind-the-scenes author of all of these newspaper articles on the problems of the "Northern Lights". He attacks, demands and has some success... An act? I need it more than anyone else? I am more Catholic than the Roman Pope? No, that cannot be! He has eyes...

In the morning I met with Vitaliy Stepanovich. He was acting very cold and alienated. He kept looking at the stupid table, while moving things around on his director's table.

He responded to my questions perfunctorily in a way that did not lead to new questions. And then as during the last evening the thought came up that the "mining enterprises also need the 'Northern Lights' and even more than anyone else. The heat from the PIES is needed by the entire rayon. And it is as if Fedortsev alone is controlling the power and heat..." There was a pause in our discussion. I stopped asking questions and he fell silent and a frown developed on his face above the uplifted shoulder in the black navy cloth. A short lock of hair fell upon the deep lengthwise wrinkle of his tense forehead. This very familiar feather suddenly explained everything.

"Vitaliy Stepanovich, where were you born?"

"Well, if that has anything to do with this..."

The added "f" at the end of the word "if" gave him away. I made a guess but did not ask him straight out. The way he said the word "if" was the way my friends talked and the way I used to talk. We lived and were friends in the city of Prokop'yevsk and received our walking papers and took in our flat stomachs with a navy belt that was the style at the time. This belt had a heavy brass buckle. Our shirts were decorated with a scrap of navy vest in three dark blue strips, and our boots were pressed into an accordian. Gera Sarnikov, Kolya Kasatkin. Volodya Mikhno... From the seventh grade we went to the factories and mines of the Kuzbass. Those of us who could fudge on our birth certificates went to the front... I threw in the difference in age and decided yes. Fedortsev was one of those who had followed us, while embracing our manners and ways. They, the craftsmen and the factory workers, managed to cut the Krupp armor by welding for resmelting into Siberian plows... My heart stopped. It was as if I had met with Gera Sarnikov.

It turned out that he was from Novosibirsk and we quickly soon began using the familiar form of address.

"Please explain why the Polyarninskoye GOK does not need the power that you can provide," I ask.

"The GOK needs the power badly. They are using diesel power units to make up the difference."

"Then why do they not share your ambitions and accept full capacity?"

"Poor management. I have done everything I can think of to reach an agreement with them, but in reply I get only outright hostility. They probably take me for a troublemaker. But I will not give them any peace."

"Can you name the people who are to blame in this matter? Who from the very beginning, since September 1974, has been responsible for the construction of the shore facilities?"

"The general contractor is the chief of the Mys Shmidt Construction and Installation Administration, Shvets. The approved norms have dictated the time period for the construction of the shore facilities within 26 months at a cost of 4,181,000 rubles. And consider the fact that this estimate was not made for our power station alone; it was planned to tow in and put into operation one other PlES - the 'Northern Lights-5'. In actuality, the construction work lasted for 51 months at a cost of 3,781,000 rubles - and that was just for the 'Northern Lights-4'! There are so many unfinished jobs and things that need to be done over that we still have not gotten ourselves out of the mess. Of course, Shvets' superiors are after him and after the chief of capital construction department of the Polyarninskoye GOK, Filonenko. His superior organization is the Severovostokzoloto Association..."

"You will not sit still, Stepanych! Think about it yourself: they are not fighting among themselves and are in no hurry to receive your power at full capacity. Don't tear yourself apart, perhaps, time can wait?"

"No, it cannot wait! And I will not permit the machinery to function for no purpose. Do not forget that I am an engineer and that my god is the electric lamp..."

We went home late in the evening. There was a frost, but the wind had died down. And here they think that if there is no wind it is not cold.

Fedortsev led me to the boiler not far from his house. We reached the furnace room though a ten-meter tunnel dug through the snow - this is used by the man who tends the furnace to remove the slag.

The furnaces made a doleful noise. The smoky, damp room was dimly lit by lightbulbs beneath the blue-gray concrete arch. The man in charge took us for members of a commission.

"How much coal do you use each month?"

"Seventy tons. Why do you ask?", the technician did not understand and went ahead and gave the report that everything was in order in his area beneath the witch on a mop on the smokestack.

"There are nine such boilers in the settlement of Ryrkaypiy. Each of them burns coal that has been transported in from elsewhere. Multiply 70 by 9 and what do you get? Then again by ten months - the rest of the time it is summer. Did you come up with an answer? But the PlES is capable of heating Ryrkaypiy with a three-fold supply of heat and hot water, do you understand? About the only expenditures would be for the installation of a heating supply ducting and my heat will be fed into the houses..."

"Vitaliy, this does not make any sense. Just a one and a half kilometer heating supply line! Have you reported this to anyone?"

"What do you think? Do you think I would keep it a secret? Everyone knows: I am a deputy of the rayon council and am no stranger there..."

Above us supported on the black train of the smoke the witch hurried through the night.

At home, in a blue outfit and tennis shoes , Stepanych no longer seemed to me to be a captain of a ship. He relaxed and the close light of the table lamp displayed the gray in his sparse light brown hair.

"Our ministry has sent a letter on behalf of the deputy minister of the nonferrous mettalury industry. The letter outlines everything, including the fact that the schedule for the start up of the PlES has long been disrupted and that the minimum start-up schedule has not been met. Some of the unfinished construction work on the project amount to as much as two million rubles! Do you know how much of this has been fulfilled? Only ten percent!. Our deputy minister, Comrade Budennyy, is proposing that if all questions are not resolved in the first six months of this year that Severovostokzoloto must rent the PlES and operate it themselves..."

"What profit is the government getting from this? Everything will simply be covered up... Have you flown to Moscow?"

"Just one time. I already told you that my god is the electric light."

I left and he remained alone in his house, the roof covered in snow, almost on the very coast of the Northern Arctic Ocean.

8927
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ELECTRIC POWER

BRIEFS

CHERNOBYL'SKAYA AES--Kiev Oblast. On the eve of the new year a state commission has accepted the third power unit at the Chernobyl'skaya AES. All of the work - from the laying of the foundation to the start-up of the power unit - was completed by the builders and installers within three years, by significantly reducing the normative time periods for the installation of the equipment. To speed up the work comprehensive mechanization was used in many sectors. More extensive use was made of construction structures that had been preassembled at the plant than before. These structures were preassembled and enlarged before being installed. Many of the subelements worked in three shifts on a sliding schedule. The Chernobyl'skaya AES is gaining strenth. Since its start-up the power station has produced more than 46 billion kilowatt-hours of electric power. Two more power units are to be put into operation during the current five-year plan. /Text7 /Moscow PRAVDA in Russian 4 Jan 81 p 17 8927

NEW POWER UNIT AT NIZHNEKAMSKAYA GES--Naberezhnyye Chelny, Tatar ASSR. Following approval in test runs the next, eighth power unit of the Nizhnekamskaya GES has been put into operation. Having been accepted by the state commission with high marks, the power unit has begun to feed current into the Unififed Power System of the USSR. The builders and installers have with honor coped with their socialist pledges. The large-unit assembly method that was used here to assemble the power units on an individual site made it possible to considerably reduce the time periods for the work. /Text7 /Moscow PRAVDA in Russian 5 Jan 82 p 17 8927

NEW POWER LINE IN STAVROPOL' KRAY--In the difficut conditions of the high mountains work is underway to build a LEP-500, which will connect the Inguri GES and the Stavropol'skaya GRES. The total length of the power lines is 417 kilometers. One of the most difficult sectors of the power line intersects the Main Caucasus Range and passes through the Karachayevo-Cherkesskaya Autonomous Oblast. The hard-to-reach spurs of the canyons are being stormed by the builders of the eighth mechanized column of the Tbilisi Kavkazelektroset'stroy trust. The new LEP will join the power systems of the Caucasus, the south and the center of the USSR into a single unit. The power system builders have received a great deal of assistance from aviators. /Text7 /Minsk SEL'SKAYA GAZETA in Russian 1 Nov 81 p 17 8927

NEW POWER UNIT AT CHEBOKSARSKAYA GES--The new power unit of the Cheboksarskaya GES has generated the first kilowatt-hours of electricity. It took the builders only half as much time to start-up the third turbine as it did to install the first. With the start-up of all 18 power units of the hydrosystem, an important construction project of the five-year plan, its total rated capacity will reach 1.4 million kilowatts. [Text] [Moscow PRAVDA in Russian 4 Jan 82 p 2] 8927

NEW POWER LINES IN TAJIK SSR--Khorog. Having completed the installation of the electric supports on the approaches to the pass above the clouds at Sagirdasht, the brigade of foreman I. Rakhimdodov from the Khorog enterprise of electrical networks has proceeded to the installation of the six-kilometer LEP. The aerial power bridge extends for 26 kilometers to Kalankhum. The 110-KV power line will be put into operation in the second year of the five-year plan. It will connect the Darvazskaya valley with the power system of the south of the Tajik SSR. [Text] [Dushanbe KOMMUNIST TADZHIKISTANA in Russian 23 Dec 81 p 2] 8927

NEW POWER LINE FROM KHABAROVSK TO KOMSOMOL'SK--The Khabarovsk to Komsomol'sk-na-Amure LEP-220 has been put into operation. The 389-kilometer power line was put into operation almost one year ahead of the standard time period. The builders fulfilled a difficult task: more than half of the path of the power line passes through swamps and flood lands. In addition there are bad roads, a great deal of heavy rains and uncommonly high floods. Specialists from Bratsk provided a great deal of help. Entire brigades on the path of the power line were made up of people from the plants imeni Yu. A. Gagarin, Amurstal', Amurlitmash and others. A student construction detachment from the Khabarovsk Institute of Engineers of Railroad Transport distinguished itself. No other such construction project has known such massive use of helicopters. For example, on the 10th of September 18 helicopters worked on the power line. The helicopter crews invested 2,300 flight hours in this work and transported 5,500 tons of various freight. Many of the operations in the installation work were unique. The best pilots from many oblasts of the USSR came to help the Far Eastern construction workers. The construction of the power line enriched the experience of Soviet work on such construction projects and became a school for the close interworking of many collectives. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 29 Dec 81 p 1] 8927

NEW POWER UNIT AT NAVOIYSKAYA GRES--Yesterday the new power unit of the Navoiyskaya GRES provided current. The rated capacity of the unit - the 12th by count - is 210,000 kilowatts. The introduction of this power unit marks the completion of work to increase the production of electricity at the Navoiyskaya GRES, which was begun during the past five-year plan. According to the program for this work at the power station they have installed two power units of 210,000 kilowatts each, after which its rated capacity was increased from .8 to 1.22 million kilowatts. Now it is possible to significantly improve the supply of power to the Zarafshana Valley, where in recent years have appeared several large enterprises of the mining and metallurgical, chemical, machine building, light and other sectors of industry. Large pumping stations have also been built here. /Text/ /Tashkent PRAVDA VOSTOKA in Russian 27 Dec 81 p 1/ 8927

FIRST POWER UNIT AT TUYAMUYUNSKAYA GES--The first power unit of the Tuyamuyunskaya hydroelectric power station, which is incorporated in the powerful hydrosystem that is being constructed here, has been placed on industrial load. The red and green signal lights are flashing, and the instrument indicators on the control panel have come to life. For the sake of this moment, the concrete workers, reinforcers, installers and insulation workers, the instrument operators and the finishers, adjusters and power engineers have worked long months in the intense heat and cold and in dust storms and rain. Their work has been successfully subjected to a comprehensive check. /Text/ /Tashkent PRAVDA VOSTOKA in Russian 27 Dec 81 p 1/ 8927

PROGRESS REPORT ON SHAMKHORSKAYA GES--At the Shamkhorskaya GES work has gotten underway for the installation of the turbine and generator. The Kura River speeds its waters through three broad concrete corridors beneath the man-made mountain of the dam of the hydrosystem. Very soon - in February of next year - the multi-ton gates of the spillway will drop down and the eternal flow of the river will be stopped: thus will begin the filling of a new mountain sea in the Cacausus - the Shamkhorskoye reservior. For more than four kilometers the earthen dam of the Shamkhorskaya GES stretches from shore to shore in a fantastic broken line. Actually it consists of three dams: a channel dam, a backwater dam, and a so-called terminal dam, which adjoins the mountain on the left bank of the Kura River. In the channel portion of designed height of the dam is 70 meters. It is being built of local materials. Inside of the enormous prism is a waterproof loamy center. This wall is to hold 12.5 million cubic meters of gravel, crushed rock and earth. As of today nearly 9.5 million cubic meters have been filled. The new hydroelectric power station on the Kura River will produce nearly one billion kilowatt-hours of electric power. But the electric current produced by the mountain river is only one of the problems facing the creators of the hydrosystem. Its importance for irrigation of the northwestern regions of Azerbaijan is of no less importance than the power. Equipment is now operating near one of the sections of the backwater dam. This is where the Shamkhorskiy machine canal begins. Seventy-five thousand hectares of land - a good half of which is still untouched virgin land - will receive life-giving moisture from the canal. The reservoir of the GES will serve as a reliable source for the canal. Nazikha Zeynalova, Hero of Socialist Labor and delegate to the 26th Party Congress and deputy of the Supreme Soviet of the Azerbaijan SSR, has very well expressed the importance of irrigation for these parts: "Water is life. Due to water we will have everything." At present the fields of the kolkhoz imeni Rustam Aliyev, where Zeynalova works, get water from artesian wells and via pipelines from the Kura River. The creation of the canal will make it possible to harvest an additional 100,000 tons of cotton, 32,000 tons of berries, quite a bit of grain and other agricultural products. The entire area of northwestern Azerbaijan will receive a new impetus for development. In the young settlement of Kura, which has sprung up near the dam of the Shamkhorskaya GES, there will be industrial enterprises. And the settlement itself, where the outlines of the first streets of multi-storey buildings are scarcely visible, will in time change into a large city not far from its ancient neighbor - Kirovabad. /Text/ /Moscow IZVESTIYA in Russian 29 Nov 81 p 3/ 8927

'NORTHERN LIGHTS' ARE WORKING--In the USSR the series production of floating gas turbine electric power stations, called the "Northern Lights", has been started. The problem of supplying power to the northern and northeastern regions of the USSR is becoming more acute for it is here that new deposits of minerals have been found and are being developed and where new cities and settlements are being built. A solution has been found in the creation of floating gas turbine electric power stations, which use a liquid fuel as well as the natural gas from nearby deposits. The first such floating power station, the "Northern Lights", with a rated capacity of 20,000 KW, was installed at the mouth of the Kolyma River. It is providing power to the mining enterprises of the region. At the electric power station two gas turbine units of 10,000 KW each are in operation; each of these gas turbines has a gas turbine engine and an electric generator. There is also a spare engine. A second floating power station of the "Northern Lights" type was placed at the river cove of the Pechora River. The next floating power station will be on the Aldan River in the Yakutskaya ASSR. And a fourth is to be installed near the young city of the West Siberian gas workers - in Nadym. /Text/ /Vil'nyus SOVETSKAYA LITVA in Russian 8 Dec 81 p 4/ 8927

CSO: 1822/73

DEPUTY MINISTER TELLS ABOUT GAS PIPELINE CONSTRUCTION PROGRESS

Moscow KRASNAYA ZVEZDA in Russian 16 Feb 82 p 4

[Interview with Grigoriy Nikolayevich Sudobin, Deputy Minister of Construction of Petroleum and Gas Industry Enterprises by a KRASNAYA ZVEZDA correspondent: "Gas Arterials of the Five-Year Plan"]

> [Text] "Respected Editorial Board!
>
> "At the November 1981 CPSU Central Committee Plenum Comrade Leonid Il'ich Brezhnev named the erection of five gas pipelines--West Siberia-Central Economic Region and Urengoy-Uzhgorod--as national construction projects. Is it possible to tell about them in detail?
>
> "Private Ye. Volkov"
>
> Deputy USSR Minister of Construction of Petroleum and Gas Industry Enterprises G. Sudovin answers the question of Ye. Volkov and other KRASNAYA ZVEZDA readers in a conversation with our correspondent.

[Question] Grigoriy Nikolayevich, what is the general picture of the construction of the country's gas arterials?

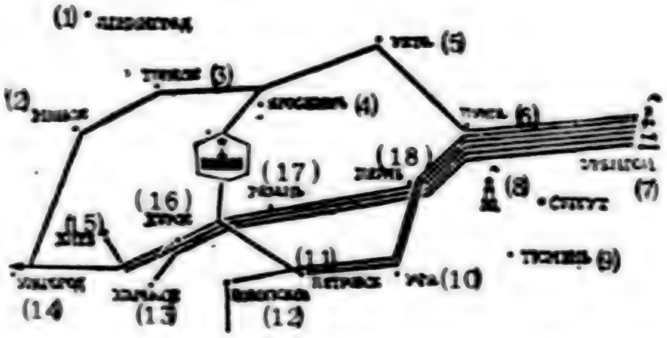
[Answer] I will begin with the fact that the builders of long-distance underground gas and oil trunk line recently celebrated a remarkable event: the counting off of the 300,000th kilometer of pipeline that they have laid was started. They have laid lines within all the Union republics of our immense motherland.

Of the five largest West Siberia-Central Economic Region trunk gas pipelines and the Urengoy-Uzhgorod export gas pipeline that Comrade L. I. Brezhnev spoke about at the Plenum, the Urengoy-Vuktyl-Ukhta-Gryazovets-Moscow trunk line was put into operation ahead of the planned deadline. Linear work has been completed also on the second Urengoy-Nizhnyaya Tura-Petrovsk gas pipeline. At the end of December the concluding "red joints" were welded near Nadym and Ufa, and thus the basic work on this 2,730-kilometer route was finished.

Ahead are new facilities. Total length of the West Siberia-Central Economic Region and Urengoy-Uzhgorod trunk lines exceed 20,000 kilometers, on which more than 200 compressor stations with a total power of more than 20 million kilowatts will be built. A pipeline construction program unprecedented in scale is being realized. In their energy potential, these trunk lines exceed the hydroelectric stations of the Angara and the Yenisey put together.

Key:

1. Leningrad.
2. Minsk.
3. Torzhok.
4. Yaroslavl'.
5. Ukhta.
6. Punga.
7. Urengoy.
8. Surgut.
9. Tyumen'.
10. Ufa.
11. Petrovsk.
12. Novopskov.
13. Khar'kov.
14. Uzhgorod.
15. Kiev.
16. Kursk.
17. Ryazan'.
18. Perm'.



[Question] Grigoriy Nikolayevich, and where is the shockwork front of the pipeline builders right Now?

[Answer] On the third route--the Urengoy-Novopskov gas pipeline, which connects the cities of Perm', Ufa and Kuybyshev and the Donbass [Donets Coal Basin]. Here the Kuybyshevtruboprovodstroy [Kuybyshev Pipeline Construction Trust] collective has appealed to trunk pipeline builders with a call to complete linear portions of the segments charged to them ahead of time, by the 112th anniversary of V. I. Lenin's birth.

Much has already been done. More than 2,500 kilometers of pipe almost a meter and a half in diameter have been received at the railroad unloading yards. Two-thirds of the pipe's total length has already been welded into section-lengths, and more than 700 kilometers of pipeline have been joined into continuous strand. Insulation and laying work are proceeding over a broad front.

In the lead are workers of the Transcaucasian Administration and Kuybyshevtruboprovodstroy Trust, where the leading collectives are the brigades of soldiers G. Agadzhanyan and A. Bloshkin. Their shockwork startup is an inspiring example for other collectives, upon which the fate of the 4,465-kilometer long Urengoy-Uzhgorod trunkline depends. This route will go, in particular, by the cities of Nadym, Tyumen' and Cherkassy. Three construction parties have already arrived on the segment between Uzhgorod and Ivano-Frankovsk. The Urengoy-Kursk and Urengoy-Yelets routes are also awaiting their subjugators.

[Question] What are the specifics and the difficulties of these construction projects? What is necessary to overcome them?

[Answer] In order to carry out the tasks that have been set, there must be maximum concentration on the capital-investment facilities that are due for early startup and on labor and material resources. I will speak frankly: it will not be easy. Pipeline construction for the year alone includes 3,000-4,000 kilometers of swamp and 400-600 kilometers of permafrost. So the problem of year-round construction, the problem of eliminating seasonality, is becoming of statewide scale and significance.

Minneftegazstroy, for its part, has approved for the 11th Five-Year Plan a specific production-type scientific and technical program for the creation of a set of machinery, technology and organization for high-speed flowline type construction of pipelines under the most complicated natural and geological conditions. The serial production of more than 70 types of new machinery and mechanisms has already started at the ministry's plants.

Because of this, the industry is feeling a sharp need for drivers of trucks, all-terrain vehicles and for operators of pipeline-layers, tractors and bulldozers. On the list of trades that are needed (and there are about 80 of them) we find welders, physicians, tug boatswains, pilots who know the northern rivers, and divers.

[Question] Grigoriy Nikolayevich, so far we have been talking exclusively about production matters. I would also like to hear your opinion about living conditions and cultural services for construction workers.

[Answer] It goes without saying that, in achieving high production indicators, well-organized living conditions are of the greatest importance. Many examples can be cited of model housing settlements on pipeline routes. Settlements such as these, with all the modern municipal conveniences, with their schools and kindergartens, may be found in the Transcaucasus Administration and in the Kuybyshevtruboprovodstroy, Severgazstroy [Trust for the Construction of Gas Industry Enterprises in the Northern Economic Region] and certain other trusts. The construction of gas-transporting systems, especially right now, in one energy corridor is enabling the creation of housing settlements to be approached on a new and still higher level. It is planned to build them, as a rule, in settled regions, close to compressor stations, where 500-1,000 people are to be located. The erection of large settlements over a long period will enable comfortable living conditions to be created everywhere at least expense for pipeline-route workers. Hundreds of thousands of Soviet people have selected for themselves this not-so-easy trade. Among them are no few construction workers who came to the oil and gas routes after their initial term of service in the army and navy. Soldiers of the reserve are glad to be at any of our construction projects.

11409
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PIPELINES

POLYMER GLUES REPAIR SUBMERGED PIPELINES EASILY

Moscow EKONOMICHESKAYA GAZETA in Russian No 44, Oct 81 p 16

[Article by Yu. Lipatov, director of the Institute of the Chemistry of High Molecular-Weight Compounds of the UkSSR AN [Academy of Sciences] and Academician of the UkSSR AN (Kiev): "'Sprut,' 'Styk,' and Others"]

[Excerpts] On the advanced frontiers of science and technology.

A complicated and very labor-intensive operation that takes much time is the repair of damaged oil pipelines that have been laid on the bottom of a river or sea. For this purpose, the pipes are raised above the surface, detachable couplings are installed, and the path to fuel flow is shut off.

The achievements of domestic polymer chemistry have enabled glues with unique properties to be created for use in any moist environment, be it water or petroleum product. As a result, the traditional approach to the repair of damaged surfaces has been changed radically, and the operating processes have been greatly simplified.

Polymer compositions of the "Sprut" and "VAK" types, which were created at the Kiev Institute of the Chemistry of High Molecular-Weight Compounds of the Ukraine's Academy of Sciences, permit the insulation of oil pipelines to be repaired directly under water. For this purpose, a reinforcing polymer coating in the form of a band is applied at the place of damage. Duration of the operation is counted in hours, not in days and months, as was the case previously.

Based upon the glues that the institute's scientists have developed for the oil pipeline transport field alone, it has also become possible to conduct restorative repair of metal oil-tank parts that have rusted through and of oil pipelines, whether on the surface or under water. Repair time is reduced by about half, as is the down time of the trunk oil pipelines during elimination of the breakdowns. The labor intensiveness of the operations performed is reduced 40 percent, expenditures on the operation of machines and mechanisms 84 percent.

As a result, the service lives of oil pipelines is tripled by the use of "VAK" and "Sprut" series glues instead of bitumen-resin or polyvinychloride insulation. Metal saved during the insulation of 1,000 kilometers of pipe is 71,000 tons. And extension of the service life of structures through improved protection against corrosion even for 5 years leads to a reduction in amortization deductions of 1,100 rubles per 1 kilometer of pipe.

Most of the glues developed by the institute were created to meet the specific needs of various branches of the economy. In this connection, their effectiveness has proved to be very high. Thus in the oil industry, a benefit of 21,900 rubles is obtained from the use of 1 ton of glue.

A number of advantages of using the new types of glue in various branches of industry can be cited. The use of 1 ton of "Styk" glue for installing electric-lighting wiring saves 900,000 expansion anchors, that is, 2,700 tons of steel.

The use of polymer glues in construction allows the erection of sanitary-engineering equipment to be speeded up, asbestos-cement pipe to be glued, and the joints of large-panel buildings to be sealed. The technology is being greatly simplified. For example, when attaching cables, the use of construction-and-installation guns and a number of special materials is precluded. The economic benefit from introducing "Styk" glue in laying 1 kilometer of a cable line is 198,500 rubles.

New fields for using polymer glues are being discovered in the coal industry--for thermal insulation of cold ducts in the mine shaft, fastening thermal insulation boards, and for repairing and increasing the longevity of the sheathing in the headframe.

Two years ago Donetskugol' Association used such glues for the first time at the Underground Mine imeni 60-Letiya Sovetskaya Ukraine. It is known that the sheathing of metal headframes is subject to strong corrosion during operation. And this requires periodic painting of the facility. The proposed method of repair is to form a two-layer of glass-reinforced plastic on the inner or outer sheathing of the headframe, enabling high reliability of the repair to be provided at minimal cost in labor and with a substantial saving of metal.

It is here that we approach one of the more difficult questions--organization of the industrial production of the polymer glues. Up to now they have been made mainly at the institute's experimental production facility. It stands to reason that the facility's production capacity is clearly inadequate to meet the demand. Yet even with the limited level of output of the product, the economic benefit from using the glues during the 10th Five-Year Plan exceeded 20 million rubles.

The institute is taking steps to organize large-scale production of the glues. The required industrial documentation has been prepared, and the technical and economic substantiation exists. However, despite the existence of the documentation, capacity is not expanding.

Minkhimprom [Ministry of Chemical Industry] is manifesting a surprising lack of interest in solving the problem at the enterprises that should organize the industrial output of the glues. This is being discussed at various levels, evaluations are being written, and conferences are being held. But, although 5 years have passed since the task was set for Minkhimprom, there has been no progress in manufacturing polymer glues serially.

The institute's experimental production facility has other functions. Even if we could have taken supply of the glues upon ourselves for a certain time, and if we had expanded output for this purpose (and there was such a potential), matters of supplying raw materials in a centralized procedure were poorly arranged.

As a result, the large reserve of metal savings associated with the introduction of polymer glues remains underused. In view of their use by many branches of the economy and the interest of various agencies, it is desirable to involve the USSR State Committee on Science and Technology and planning organs in the solution of this question. One of the possible measures would be the creation of a science and production association, based upon the institute and its experimental production facility and also upon one enterprise of the chemical industry. Then the potential for solving all the scientific, technological, technical and economic problems and for organizing mass production of such a necessary industrial material in integrated fashion would emerge.

11409
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MOST PIPELINE CONSTRUCTION IS AHEAD OF SCHEDULE

Moscow STROITEL'NAYA GAZETA in Russian 10 Feb 82 p 2

[Article by V. Avtonomov: "The Pipelines Are Ahead of Schedule"]

[Text] "During the first year of the 11th Five-Year Plan," reported Minister B. Ye. Shcherbina at an expanded session of the USSR Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] board, "the collectives of the ministry's enterprises and organizations have continued to build up the pace of construction of facilities for oil and gas industries. The amount of construction and installing work done has grown considerably over last year's work.

"The year's program for contracting work was completed ahead of time and the goal for labor productivity was exceeded. Introduced into operation were 10,100 kilometers of trunk pipeline and 59 compressor and pump stations. The Urengoy-Gryazovets-Moscow gas pipeline, which is the first of six named by Comrade L. I. Brezhnev as national construction projects of the five-year plan, was connected up and introduced at design capacity. Linear work on the Urengoy-Petrovsk gas pipeline was completed ahead of schedule. Construction of the Urengoy-Novopskov gas pipeline was proceeding full scale, and work started on the Urengoy-Uzhgorod export gas pipeline. Erection of the Tol'yatti-Odessa ammonia pipeline was completed."

However, along with the industry's successes, there are still important deficiencies and unused reserves to which the reporter called attention. Last year a lag in the construction of important oil-industry facilities was permitted. The Krasnoyarsk-Irkutsk, Caspian-Orsk and Perm'-Al'met'yevsk oil pipelines and a number of pump stations and tank farms were not put into operation. This was the result of serious deficiencies and oversights in the activity of a number of the ministry's subdivisions, particularly Glavvostoktruboprovodstroy [Main Administration for Pipeline Construction in the Eastern Economic Region], Glavtyumenneftegazstroy [Main Administration for the Construction of Oil and Gas Industry Facilities in Tyumenskaya Oblast] and Glavsibtruboprovodstroy [Main Administration for Pipeline Construction in Siberia]. The plan for the total amount of construction commodity output was not met. Certain main administrations, associations and trusts are slow in reorganizing their management style and methods. In some subunits, equipment is being used unsatisfactorily, despite a shortage of it. Worktime losses are great.

Major tasks were set for the industry's workers for 1982 and for the five-year plan as a whole. Chief among them were an accelerated pace in erecting the system for transporting gas from Tyumenskaya Oblast to the central regions of the European portion of the country and the Urengoy-Uzhgorod export gas pipeline, and the introduction of each gas pipeline into operation 2-3 months ahead of schedule.

The board and the presidium of the Central Committee of the Trade Union of Oil and Gas Industry Workers have approved socialist commitments for the industry's workers for 1982 and for the 11th Five-Year Plan.

CPSU Central Committee Secretary V. I. Dolgikh and Deputy Chairman of the USSR Council of Ministers V. E. Dymshits addressed the session of the board. Supervisory workers of ministries and agencies took part in the board's work.

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SPECIAL INTEGRATED GROUPS BUILD URENGOY-PETROVSK GAS PIPELINE SEGMENTS

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 1, Jan 82 pp 5-8

[Article by V. Z. Mikhel'son (Kuybyshevtruboprovodstroy [Kuybyshev Pipeline Construction Trust]): "Introduce the Work Experience of Advanced Integrated Flowline Groups More Widely"]

> [Text] Reduction of the time taken to build oil and gas arterials is of great importance in speeding up development of the country's pipeline transport, which 26th CPSU Congress decisions called for.
>
> The information published here publicizes the work experience of speedy integrated flowline groups (from Kuybyshevtruboprovodstroy Trust and the Transcaucasus Pipeline Construction Administration) that laid 100-110 kilometer long sections of the Urengoy-Petrovsk gas pipeline route in 4-5 months.

A High Construction Pace

Kuybyshevtruboprovodstroy Trust established a specialized integrated flowline group to build a 111-kilometer (kilometer 2186-2297) section of the Urengoy-Petrovsk gas pipeline. A special design for organizing the work was prepared in order to complete the linear work ahead of time, in accordance with the collective's socialist commitments. This design called for, first of all, step-by-step performance of the work, the execution of all types of operations simultaneously, and the creation of work-start backlogs by stage.

Rotary welding began at the end of 1980. The rotary-welding section was manned by a rotary welding brigade that worked in two shifts, plus a brigade for the manufacture of curved inserts. Sections of 1-1.5 kilometers were welded each day. Twenty-eight workers, including 11 welders, were engaged in this work.

After building up a 1½-2 months backlog of accomplished rotary welding and an adequate number of curved inserts, the pipe sections were brought out to the route. Sixteen pipe-section carriers (based on KrAZ-255 and Ural-375 vehicles) hauled the pipe and 6 bulldozers prepared passages along the route (shearing off gullies) and access paths to the line, and worked on the recultivation of plowed sections.

The next step was overhead welding.

In April 1981 the basic earthmoving equipment was concentrated on the route: rotary and single-bucket excavators and bulldozers. These machines dug continuous ditching (without breaks) prior to the start of the insulating and pipelaying work.

In May the insulating column was deployed to the route, starting its work at the end of the month. After the insulation coating was applied, the pipeline was backfilled. The bulldozers that had prepared the passages along the route were used for this operation. The pipeline was ballasted by a pipelayer and excavator. This work was done by the earthmoving group. Right after the pipeline was backfilled, the layer of fertile soil was returned to its previous position. In order to provide for high quality in returning land to cultivation, the soil above the ditch was compacted into a strip. On passing the borders of a rayon, the land was turned over to the land users.

This method of organizing construction precluded idle time caused by noncoordination of the actions of the subunits and enabled labor productivity to be increased through a continuous work front for all operations.

A. G. Pridantsev's integrated brigade did the earthmoving work. It consisted of three elements: one for primary recultivation; one for excavating ditching and crossings; and one for ballasting the pipeline, backfilling the ditch and returning the land to cultivation. An engineering technician was employed in each element.

A column equipped with 7 pipelayers (1 in reserve), 2 insulating machines and a bulldozer based on the S-100 tractor did the insulating and pipelaying work. Twenty-two men manned the column. The column included an element of 7 people who constructed crossings at roads and railroads. This element was equipped with two pipelayers, an excavator, a bulldozer and the necessary equipment.

The welding and assembly work was done for the operating flowline group by two brigades that worked in two shifts. On the first shift the brigades of N. A. Baryayev and N. A. Nikitin (18-20 people, 11 welders in each) worked by the flowline-breakdown method. One brigade was equipped with an S-594 pipelayer, 14 welding sets (3 in reserve), a bulldozer, a tractor and a full set of auxiliary welding equipment. The brigades of E. Ya. Muranayev and P. V. Gotovko, which had approximately the same number of people, worked on the second shift, using the same equipment.

Because of the large number of crossings (of gullies, rivers, roads, pipelines, communications cables and so on), an integrated brigade that worked in two shifts was created. Six welders worked on each shift. The brigade was outfitted with [illegible] pipelayers, 8 welding sets (2 in reserve), a heavy bulldozer, an excavator, a water-drainage machine and a power plant.

A special team of assemblers, who welded the loops before the insulating column approached, was organized. This organization of welding and assembling operations enabled the daily welding stride to be in the 1.2-1.5 kilometer range without a single interruption.

Total manning of the assemblers in the flowline group was 120, including 42 welders.

All the technological processes were monitored systematically, step-by-step, [illegible] route. The quality of overhead and rotary welding was monitored by the [illegible] method, round the clock, by special brigades. One brigade checked the quality of rotary welds, the other of overhead welds, while a third brigade processed the film, made out the inspection papers and issued the summaries. All this insured the required quality of the welded joints.

The pipeline was laid at the designed grade level for its entire distance, and there were no comments on the quality of the insulation coating.

The assignments and the manning of the brigades and columns that are being examined enabled insulating and pipelaying to be carried out stably with a completed work cycle at the rate of 1-1.2 kilometers per day. In a week 6-7 kilometers of pipeline were erected. On Sunday the flowline workers rested, a fact that had a positive effect on labor productivity.

On the route section charged to the trust, five tap units, the connection with the Sergiyevskaya KS [compressor station], a chamber for receiving the cleaning pig, and a manifold at the River Sok had to be erected. A separate brigade was established to do this work.

The chief of the flowline group, who supervised the chiefs of sections and also the superintendents of earthmoving, welding and assembling, and insulating and pipelaying operations, managed the flowline group.

Controllers worked at the sections for prompt reporting of the basic operations and of vehicle-transport operations, the dispatch of freight, and so on.

Radiotelephone communication was accomplished only between settlements. However, practice indicated that communications with brigades and columns are necessary for the responsive solution of all questions.

The trust's repair service and Soyuzremonttruboprovodtekhnika [All-Union Association for the Repair of Pipeline Equipment] repair brigades performed preventive and emergency repair on equipment.

There was no singular amount of idle time, because the column and brigades had reserve machinery. However, there were not enough spare parts. Thus it is extremely necessary that the brigades' parts inventories be constantly replenished.

Organizing the construction of a gas pipeline by an integrated technological flowline group required the detailed development not only of technical and technological solutions but also of questions of ideological support. In order to lay a section of the gas pipeline in the shortest possible time at least possible expense, the trust's party committee examined the organization of the flowline group's work and approved the integrated plan of measures for the ideological support of construction. Measures were taken to improve political education work and organization of the amenities and of leisure time for the construction workers. Much attention was paid to selecting worker personnel and the engineers and technicians who were charged with supervising the various technological operations.

In each brigade, workers' conferences were held, socialist commitments were discussed and adopted, and an agreement for competition among brigades under the "workers' relay race" principle was signed. Competition results were summed up weekly.

The association's party group worked in the flowline group under party group organizer A. N. Doroshev, brigade leader of the insulating and pipelaying column. All the prerequisites for normal worker living conditions were created on the line.

The work organization that was adopted and the execution of measures that had been planned enabled the construction time of this most important gas arterial of the country to be greatly reduced.

The Flowline Group's Stride--25-35 Kilometers Per Month

The integrated flowline group of the Transcaucasian Pipeline Construction Administration (ZUST) carried out in 5 months (from the middle of May to the middle of October 1981) all the linear work, including recultivation, on a 101-kilometer long (kilometers 2436 to 2537) section of the Urengoy-Petrovsk gas pipeline, which is 1,220 millimeters in diameter.

In 1979 the Transcaucasian Pipeline Construction Administration proceeded to establish in Syzran' an integrated flowline group for erection of the Chelyabinsk-Petrovsk gas pipeline. In 1980 the ZUST integrated flowline group completed this work successfully and was transferred at the end of 1980 to the Gryazovets-MOK [Moscow District Gas Ring], where it built 30 kilometers of pipeline 1,420 millimeters in diameter in 2 months (January-February 1981).

In May 1981 the integrated flowline group proceeded to promote linear work on the Urengoy-Petrovsk gas pipeline route. In order to achieve a high construction pace, personnel and material resources were concentrated at the section, the organization of linear operations was improved, and good living conditions were provided for all the flowline group's workers.

The integrated flowline group included three specialized operating sections and an automotive column. The welding and assembly operations section of SUMR-3 [Specialized Mechanized Operations Administration No 3], which was charged with all the welding and assembly work and the upkeep of the settlement for 500 people, became the base. The prime contractor (SU-2 [Construction Administration No 2]) was not engaged in the upkeep and servicing of the settlement. The second section of the general contracting administration did earthmoving, insulating and pipelaying work. The third section--SU-1--carried out all the construction operations and the erection of pipeline crossings of roads. The automotive column performed all types of transport work.

The route of the gas-pipeline section passes through Kuybysnevskaya Oblast' along a flat forested steppe locality in the Syzran' region. The area of the gas pipeline construction work is characterized by a well-developed transportation network.

During the integrated flowline group's erection of the gas pipeline, 101 kilometers of 1,220-millimeter diameter pipeline were welded, insulated and laid down, 3.5 million cubic meters of soil were moved, 8 kilometers of route were cleared of forest, 36 kilometers were cleared of tree stumps, 2,484 sets of UBO-2 hold-down weights and 369 pairs of screw anchors were positioned, and crossings were built under 3 railroads, 12 roads, 8 small streams, 15 underground service lines, and 13 gullies and creeks.

The rate of advance of the integrated flowline group averaged up to 20 kilometers per month. The best indicators achieved were: 33 kilometers of overhead welding in June, 27.6 kilometers of ditching in June, and 36.2 kilometers of line insulated in July. The gas pipeline was insulated and backfilled in 100 days, at an average daily pace of 1 kilometer, ditching took 118 days, at an average rate of 0.8 kilometer per day, and overhead welding took 139 days, at a rate of 0.9 kilometer per day.

The integrated flowing group was manned by 460 workers, of whom 22 were engineers or technicians.

The flowline group was equipped with the following: 32 pipelayers, 18 bulldozers, 13 single-bucket and 2 rotary excavators, 2 welding installations, 60 welding sets, insulating and cleaning machines, a pipe-bending machine, 29 welded-pipe section carriers and pipe-length carriers, 7 dump trucks, 4 tank trucks, 9 vehicles for carrying rotating-duty personnel, 16 special vehicles (general-purpose trucks and cars), 4 PARM's [field automotive repair shops], a drill rig, 3 lowboys and 3 truck cranes. The existence of a definite reserve of equipment and the correct use of it enabled continuity and a high pace of linear work to be supported.

Not only good supplying of equipment but also, the main thing, precise organization of the work in all elements of operation on the line, promoted the successful activity of the ZUST integrated flowline group.

In order to carry out preparatory operations ahead of time, special brigades were established in the flowline group: to clear the route and to do primary recultivation work (removal of the fertile layers of soil); to do earthmoving work at terrain cuts; and to arrange crossings under roads and railroads.

A brigade of seven people loaded and unloaded pipe and the welded pipelengths.

Rotary welding was performed on a bed in two shifts: the first shift worked from 0730 hours to 1730 hours, the second from 1730 hours to 0200 hours. The presence of a superintendent or foreman was mandatory for each shift. Labor productivity on the first, the day shift, was 22-25 sections (600-800 meters); on the second, the night shift, it was 15-18 sections (450-550 meters). The rotary welders' brigade, which was composed of 20 people (6 of whom were welders and 2 were semiautomatic machine operators), supported a work pace of up to 1.4 kilometers of pipe sections per day. Rotary welding was ahead of overhead welding by 20-25 kilometers. A team of three people did the pipebending.

The welded pipelengths were sent out onto the route on a motor-vehicle column that was structurally included in the integrated flowline group. Dispatch of the welded lengths was ahead of overhead welding by at least 8 kilometers. The brigades of drivers of the welded pipe section haulers and the pipe-length carriers were under experienced supervisors.

The ditches were excavated by a brigade of rotary excavator operators and a brigade of single-bucket excavator operators. Prior to the approach of the insulating column, 3-5 kilometers of ditch were dug out. In order to clear it of spoil, a specially singled-out single-bucket excavator constantly moved ahead of the column by 0.5-1.5 kilometers. The daily pace of ditch-digging was 0.5-1.5 kilometers. Productivity of a single-bucket excavator was 100-150 meters, of a rotary excavator--400-800 meters.

Overhead welding was performed on one shift, which lasted 9-12 hours. Up to 16 welders, in addition to brigade leaders, were employed simultaneously on this work. No overhead welding was done at night. The pace of overhead welding was 0.4-1.5 kilometers per day. Overhead welding was ahead of insulating operations by 10-15 kilometers.

At crossings and silty spots, an individual welders' brigade was employed. Seven engineers and technicians supervised the welding and assembly operations. Total worker manning at the welding and assembly section, taking the servicing personnel of the large field settlement into account, was 200 people.

When erecting a section of the gas pipeline, joints were monitored 100 percent. In a short time, 10,000 joints had been X-rayed, almost 100 joints per day. Only a few joints, with minor defects, were rejected.

The pace of the insulating work reached 2 kilometers per day. Twenty men were employed in the insulating column. On steep slopes and at crossings, the insulating coating was applied manually by a specialized brigade made up of 6 people. This same brigade ballasted the gas pipeline.

Backfilling of the gas pipeline and recultivation of the construction strip was accomplished by a special brigade of bulldozer operators, which lagged behind the insulation workers by 1.5-3 kilometers, enabling timely preparation of the gas pipeline for turnkey turnover.

Electrochemical protection was completed in September 1981 by the EKhZ [electrochemical protection section] of SU-2.

A separate brigade eliminated the small number of "breaks."

The construction of crossings under roads, the erection of tap components and other construction work were performed by SU-1, which increased the flexibility of other operating elements.

The repair service helped to provide for continuous performance of welding and assembly work at a high pace. The mechanical engineers of the SUMR-3 section managed to organize preventive inspection and repair of equipment in such a way that in June and July welding operations were carried out in 29 days of the month. The section of SU-2 and the automotive column had their own repair brigades.

The brigade contract, which yielded substantial economic benefit, was used in the integrated flowline group.

Not only precise work organization but also well-arranged living conditions played a major role in achieving high productivity indicators. Good living conditions were established for the builders at the field settlement, on the outskirts of Syzran'. An evening intermediate school for working youth was opened on the route for the first time.

The results of the socialist competition among the brigades and within brigades were summed up promptly for the flowline group; they were widely publicized, and measures for moral and material incentives for workers who distinguished themselves, were adopted.

The party group that conducted ideological work operated within the integrated flowline group.

The management of the flowline group established a staff, at which the chief of the flowline group and two controllers worked. Each day the staff held a planning meeting, from 2000 to 2100 hours in which all section chiefs, superintendents and managers of services participated. The tasks for the next day were issued orally and they were always carried out completely. Not only the supervisors but also the workers, especially the welders and drivers of the operational transport, were distinguished by high performance discipline.

Thus the experience of the large ZUST integrated flowline group showed that it is possible to provide for a stable pace of line operations of 1.0-1.2 kilometers per day, or 25-35 kilometers per month, where shiftwork lasts 10 hours, in building a gas pipeline 1,220 millimeters in diameter in the Volga environment.

The new structure of the trust and of the integrated flowline group, many elements of which coincide with the structure worked out by Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], promoted more precise relationships of the operating elements.

Providing the section under construction with good roads and passages along the route created conditions for highly productive work by the earthmoving, welding and assembling, and insulating columns.

The existence of a definite equipment reserve and its correct use also helped to preserve the high work pace of the columns through the rapid replacement of malfunctioning equipment by equipment in good working order.

The establishment in the flowline group of a special section for constructing crossings under roads and railroads, the erection of tap assemblies, and the execution of other construction work enabled the set of operations on engineering and operational preparation of the route to be performed ahead of time and created conditions for the continuous advance of the insulating and pipelaying columns.

The wide development of socialist competition among brigades and the arrangement of ideological work in the flowline group helped to establish in the group high labor and production discipline, which was a most important factor in organizing the whole set of linear operations.

One-man management in combination with collective supervision of the flowline group (the daily hour-long planning-group meeting) enabled not only the elimination of disagreements among individual sections and services but also rational use of the reserve equipment.

Work under the brigade contract and job orders promoted a substantial growth in labor productivity and a rise in work quality.

Good organization of the repair services enabled not only a sharp reduction in time spent on current and emergency repair of machinery and mechanisms but also, the main thing, the maintenance of the available equipment in an efficient state.

The high skill level and responsiveness of the middle management of the teams and of the line personnel enabled the effective daily utilization of workers and of construction equipment.

The success that was achieved confirmed the correctness of Minneftegazstroy's policy of choosing the southern variant of the power-engineering corridor, where low population density and marshiness of the route, a good transportation network and the potential for wide use of rotary excavators existed.

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ADVANTAGES OF LAYING GAS PIPELINE ON OR ABOVE GROUND DISCUSSED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 1, Jan 82 pp 30-31

[Article by N. I. Avdeyenko (Noril'skgazprom [Noril'sk Gas-Industry Production Association]): "Experience in Operating the Above-Ground Messoyakha-Noril'sk Gas Pipeline"]

> [Text] Many years of observation have indicated that laying gas pipelines above-ground on pile supports with the crossbars as close to the ground surface as possible (0.3-0.5 meter) practically precludes pipe vibration.

The first gas pipeline beyond the Arctic Circle--the Messoyakha-Noril'sk--was built in our country in 1969. There had been no previous experience in world practice in the construction of gas pipelines under the exceptionally difficult natural, climatic, physical and geological conditions of the Taymyr arctic. The gas pipeline route runs in a latitudinal direction and intersects 10 water barriers, including such ones as the Yenisey, Bol'shaya Kheta, Malaya Kheta and Norilka.

Winter lasts 8-9 months here, with temperatures down to -56 degrees C and frequent winds whose velocity often reaches 20-30 meters per second. All over the area where the pipeline was laid are rocks that have been frozen for many years and are high in ice content (up to 70 percent). Moving ice is widely distributed. Frequent ambient air-temperature drops, which are inherent to the region, reach 20 to 30 degrees C in a day, and seasonal differences range up to 80 degrees C.

The great distance from industrial and cultural centers, the complete lack of roads, the short navigation season, the delivery of freight and people to the production facilities by helicopter, and the difficult climatic conditions create many difficulties for the construction and operation of gas pipelines and gas-field facilities.

Because of the universal distribution of permafrost and icy, heaving and unstable soils, and on the recommendation of VNIIST [All-Union Scientific-Research Institute for Trunk Pipeline Construction], above-ground laying of the gas pipeline was designed by VNIPIgazdobycha [All-Union Scientific-Research and Design Institute for the Design of Gas-Recovery Enterprises] and was performed by construction workers.

The existing gas pipeline is a two- and three-strand system of pipe 720x8 millimeters in diameter for straight sections and 720x11 millimeters for the compensation sections. The pipelines were laid out on the flat according to a scheme proposed by VNIIST, that is, rectilinearly, with slightly curved sections. The pipeline consists of rectilinear sections laid on freely sliding supports, which allow the pipeline to move in lateral and longitudinal directions while compensating for temperature deformations. The pipelines are raised above the ground's surface 0.5-2 meters, depending upon the terrain.

The gas pipeline crosses small streams by guyed crossings with adjustable tension members that are fastened to pylons. For anticorrosion protection, the pipes were coated with VNIIST-2 and VNIIST-4 axle grease.

The gas-pipeline supports were made of wooden and partially of reinforced-concrete piles, and, across gullies, they were made chiefly of pipe.

Based upon the operating experience of the first strand of the Messoyakha-Noril'sk pipeline, specialists of scientific-research and design institutes, jointly with Noril'skgazprom operators, worked out a series of new engineering solutions and incorporated them in the construction of the second gas pipeline strand and, especially, of the third strand:

the distance between supports was reduced;

adjustable crossbars were used;

the design of movable and immovable supports was improved;

reactive supports for purposes of localizing the sections in case of accidental destruction of the pipelines were specially developed; and

check valves for reducing gas losses during pipeline breaks were used.

Other technical solutions aimed at raising the operating reliability of the above-ground gas pipeline also were used.

Introduction of the new developments has enabled increased reliability of operation of the second strand of the gas pipeline and of the parts of the third strand that have been introduced into operation.

As a result of the effects of ambient temperature, wind loads, solar radiation, heaving forces, and subsidence of the supports, an above-ground pipeline is in constant motion and is an extremely unstable dynamic system. Operating experience indicates that the basic causes of the appearance of cracks and the destruction of pipe are aeroelastic vibrations.

It is known that windy weather predominates on the Taymyr. In a pipeline 720 millimeters in diameter, with a span (without crossbar support) of 30 meters or more, where wind speeds are 8-9 meters and higher, aeroelastic vibrations occur with a frequency of 100-120 oscillations per minute.

The first strand of the gas pipeline was designed and built with 30-35 meter span between supports, but on the second and third strands the distance between supports was reduced to 15 minutes. Vibration does not arise when there is uniform support of the pipeline on the crossbars with a 15-meter span. However, in practice, on many gas pipeline sections, as a result of temperature drops, heaving, and subsidence of the pile supports, the alignment is disturbed and gaps appear between the pipeline and the crossbars, that is, the length of the free span is increased, as a result of which pipeline oscillations arise.

Analysis indicates that since the start of operation of the gas pipeline laid above the ground, more than 80 percent of the breakdowns have occurred because of the forming of fatigue cracks at the places where the pipe rests on the crossbars, caused by vibration. Uniform resting of the pipe on the crossbar is of exceptionally great importance for pipeline laid above ground. It is typical that when a gap of even a few millimeters is formed between the pipe and the crosspieces, vibration arises and its amplitude increases, because the crossbar begins to be lowered because of the blows.

Among the causes of destruction of gas-pipeline alignment are the lowering of the crossbars from the uneven load on the part of the pipeline and inadequacy of the fastening thereof.

The phenomenon of pile heaving, as is known, is observed in the winter. Metal piles made of pipe are subjected to the most active heaving. With heaving of a pile, the pipeline separates from the neighboring supports and a high lateral bending stress is created, which in some cases leads to the destruction of stability and the occurrence of emergency situations on the gas pipeline. Even the most precise observance of standing orders on gas-pipeline operation will not preclude the appearance of vibration.

Antivibration structures of VNIIST and TsNIPR association design are now undergoing industrial-test experiments on the Seleninskoye-Messoyakha-Noril'sk gas pipeline. With positive results of the tests, the installation of vibration dampers was desirable. This enables the appearance of aeroelastic pipeline vibration in the windstream to be precluded and the gas pipeline to be aligned during preventive maintenance, when conditions are more favorable for the passage of special and transport equipment.

The impossibility of using cleaning pigs for maintaining higher hydraulic effectiveness is one of the deficiencies of an above-ground gas pipeline. Using them can lead to destruction of a support portion that is made of wooden or reinforced-concrete piles.

The design calls for wooden piles at least 26 centimeters in diameter, but the piles often are actually smaller in diameter, a factor that reduces their load-bearing capability. Moreover, although the processes of wood decomposition are weakened at the low temperatures of the Far North, at points of air and ground contact the piles are subjected, as a rule, to constant destruction by coming into contact with ice in the winter and water in the summer.

Reinforced-concrete piles at points of air and ground contacts are destroyed to a greater extent than are piles made of wood or metal pipe.

Above-ground gas pipelines that operate in complicated conditions require exceptionally rigid monitoring of their operational condition. Careful conduct of preventive inspections and the timely discovery and elimination of defects in pipes and in the supports will enable emergency situations to be avoided.

Continuous defectoscopy is of great importance in the timely detection and elimination of pipe defects. Apparatus for continuous defectoscopy of gas pipelines and methods of searching for gas leaks in any weather, using equipment that is easily transportable, must be developed.

The most vulnerable portions of an above-surface gas pipeline are the underwater crossings. With the onset of winter, gas in the floodplain sections of an underwater crossing has a temperature as low as that of the outside air. During November and December the soil that surrounds the inverted siphon freezes up completely as a result of transporting the cold gas, and in this case the pipeline is squeezed in the frozen soil, losing its compensating capability. In thawed-rock sections, frozen ground forms anew, and this is accompanied by intense ice separation and heaving.

Research performed by the Dudinka Expedition of the Geocryology Department of the MGU [Moscow State University] Geological Faculty has indicated that enclosed thawed zones that are localized at a siphon in a floodplain should be considered most dangerous, for the freezing of these zones results in heaving forces that lead to breaks in the pipe, which is squeezed on one side or both sides.

Noril'skgazprom specialists have successfully worked out and used a method for reducing the negative effect of moving cold gas on the operating stability of a gas pipeline in a river's floodplain. The use of a calculated periodicity of operation of the inverted siphons will enable their operating regimes to be changed and a potential for controlling the dynamics of the freezing of islands of seasonally thawing soils to be created.

Many years of observation have indicated that laying gas pipelines above-ground on pile supports with crossbars as close to the soil surface as possible (0.3-0.5 meters) practically excludes pipe vibration.

At the start of winter, an above-ground gas pipeline that is as close to the ground surface as possible becomes drifted over with snow, and its compensating capability is completely preserved. The powerful warming effect of the snow cover raises the temperature of the gas being transported and suppresses the effect of continual sharp outside-air temperature changes on the pipeline.

Above-ground and on-ground methods of laying gas-gathering grids were tested at the association's gas-field facilities over a long period. With above-ground pipelaying, grids of pipe without thermal insulation are subjected to extremely frequent temperature changes and substantial wind loads, which lead to continual longitudinal and lateral shifts of the pipelines, which, in turn, lead to an accumulation of fatigue stresses in the pipe's metal. With frequent change in below-freezing air temperatures it is difficult to maintain the prescribed hydrate-free regime for transporting gas in the pipe networks.

Operators have become convinced that the method of laying the pipe networks on surface supports with slightly bent compensators is the most acceptable one. Primarily, it enables avoidance of the extremely low temperature of the gas stream, thanks to the natural cover over the networks provided by snow at the start of the winter. In this case, the gas arrives at the installation for preliminary preparation 15-20 degrees higher than the ambient air temperature, even in very intense cold. In networks laid on the surface, a practically stable temperature regime is established with minimal hydraulic losses. In this case the necessity to build expensive departments for preheating the gas at the UKPG [integrated gas-treatment plant] intake is dispensed with.

Based on operating experience, the association's specialists have developed engineering solutions and working drawings with substantiations and computations for the on-surface method of laying gas-field pipeline networks, taking into account the Taymyr arctic tundra environment. The gas-gathering grids at the new Severo-Soleninskoye gas-condensate field, where the facilities are now being built up, should be laid in accordance with the indicated engineering solutions.

Conclusions

1. The laying of gas pipelines by the above-ground method, with maximum proximity to the ground (0.3-0.5 meter), enables pipe vibration in the windstream to be practically excluded, and, thereby, cracks in the pipes at the points of resting on the crossbars to be avoided, and the temperature regime of gas-pipeline operation to be stabilized, thanks to use of the warming effect of the snow cover.

2. Laying gas-field gas-gathering grids on the ground will enable a normal hydrate-free regime of gas gathering and exclusion of the need to preheat the gas at the UKPG.

3. The use of the snow cover as a thermal insulator against the low temperatures of the outside air averts cooling of the gas and pipe metal, thereby precluding emergency situations caused by cold brittleness of the steel.

4. The rise in temperature of the gas stream at the intake from the above-ground portion of the gas pipeline into the underground section in river floodplains is reflected favorably in the operation of the inverted siphons, and it raises their reliability.

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PIPELINES

BRIEFS

POLYMER PIPELINE-PACKING RINGS--How can corrosion and early breakdown of the connector joints of pump and compressor pipes be avoided, and how can they be sealed reliably? Scientists L. S. Pinchuk, V. A. Gol'dade and A. S. Neverov of the Gomel' Institute of the Mechanics of Polymer-Coated Metal Systems of the Belorussian SSR Academy of Sciences have helped Belorussia's oilfield workers to answer these questions. In collaboration with Belorusneft' Production Association representatives, they have developed packing rings made of special polymer materials. In contact with metal pipeline parts, these materials are capable of "suppressing" corrosion. The deformability of the rings and, in particular, their design shape, enable coupling joints to be sealed reliably. Low cost and the potential for repeated use of these packing elements enables them to replace successfully the steel ring inserts in coupler connections that are intended for aligning pipeline cross-sections and for reducing eddying of the stream of the medium being transported. This innovation is being introduced at facilities of the Belorusneft' and Ukrneft' production associations and of UkSSR Ministry of Geology drilling administrations, and it promises much economic benefit. The materials developed by the scientists have been recognized as inventions. [Text] [Minsk SOVETSKAYA BELORUSSIYA in Russian 12 Feb 82 p 1] 11409

HUSKS FOR FASTENING CASING--It has become possible to double the operating life of oil and gas wells without resorting to overhaul, by means of polymer plasticizers and...husks. Such a multiple-purpose additive greatly increases the strength of the cement that fastens the casing strings. Research conducted in the Central Asian Scientific-Research and Design Institute for the Oil Industry indicates that fibrils of husks serve as a unique fastener for the cementing layer. It becomes elastic and resistant to any deformation, for example, to the effect of explosions that are set off to stimulate the oil or gas flow in the productive formation. In the opinion of specialists, multiple-purpose additives based upon plasticizers and fibrous materials will also find use in the building-materials industry. [TASS correspondent O. Igamberdyyev] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 3 Mar 82 p 3] 11409

UKRAINIAN PIPE PLANT REBUILT--The rebuilding of Department No 2 of the Novomoskovsk Pipe Plant in Dnepropetrovskaya Oblast has been awarded the USSR Council of Ministers Prize for 1981. This work was performed by Ukrgipromez [Ukrainian Branch of the All-Union State Institute for the Design of Metallurgical Plants] and Dneprotyazhstroy [Trust for the Construction of Heavy Industry Enterprises in Dnepropetrovskaya Oblast] collectives. The department's capacity for producing pipe for the oil and gas industry has grown by almost 180,000 tons per year as a result of the reconstruction. The new equipment was installed in a minimum of time. The production halt lasted 45 days instead of the 2 months planned. The introduction of progressive technical solutions and advanced construction methods enabled about 3,000 cubic meters of concrete and reinforced concrete, 1,400 tons of metal and 250 tons of cement to be saved. Actual costs for the reconstruction were 100,000 rubles below the budget-estimated cost. Work quality was deemed excellent. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 44, Oct 81 p 9] 11409

BETTER STEEL FOR PIPELINES--Volzhskiy (Volgogradskaya Oblast)--27 Feb--The output of products that has begun at the Volzhskiy Pipe Plant is intended for trunk gas pipelines that are being built in the Far North and the hot south. The enterprise manufactured its first lot of high-strength large-diameter pipe that will withstand a pressure of 75 atmospheres. This success of the Volzhskiyites is by right shared with metallurgists of the Novolipetsk plant and Zhdanov's Azovstal' and the collectives of the scientific-research institutes where the economical high-strength metal and new electric welding technology were created. In brief, the whole complex of problems associated with giving birth to pipe for gas arterials was solved. The Novolipetsk plant's collective was the first to master the output of the low-alloy steel treated with synthetic slag. Metal will be smelted and rolled in accordance with this new technology at Azovstal'. The giant plate manufactured at Zhdanov will be sent to a tube-welding mill. Most experienced operators N. Karamshin, I. Ivashchenko and others will be at the control panels. [TASS correspondent I. Biryukova] [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 28 Feb 82 p 1] 11409

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